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Illinois Coal:

Markets and Delivery Systems



Illinois Department
of Transportation
Office of Planning and Programming

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ILLINOIS COAL: MARKETS AND DELIVERY SYSTEMS

ILLINOIS DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING AND PROGRAMMING

April 1983



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PREFACE

This report summarizes an Illinois Department of Transportation study of coal transportation within Illinois. The majority of coal traffic, approximately 79 percent, is Illinois coal destined for Midwestern and Southern markets, primarily to utility companies. Western coal destined for Illinois utilities represents about 19 percent of the total coal traffic. Small amounts of Kentucky and Indiana coal are also shipped to Illinois utilities. Coal traffic was analyzed by mode of transportation to illustrate the importance and function of each mode in Illinois' coal transportation system. Overhead traffic through the state and shipments of coke were not included in the analysis.

The study identifies the transportation facilities used to move coal in 1980 and the facilities which are expected to carry coal in 1990. The analysis of the 1980 system was based on actual coal traffic patterns. For Illinois-produced coal, the total study tonnage of 59 million tons for 1980 represents 94 percent of the 62.5 million tons of coal produced that year. Existing long-term coal contracts between mining companies and utilities were used to project the 1990 coal markets and transportation system that will be needed to reach these markets.

To enhance the understanding of the role of transportation in the marketability of coal, the study includes background on coal reserves and production, a domestic market analysis for Illinois coal, and an assessment of the potential for exporting Illinois coal to foreign markets.

The study also presents a brief discussion of issues that will impact future coal markets and therefore the transportation system required. Issues discussed in this report include:

- o Enforcement of Existing Air Quality Standards;
- o Proposed Legislation for Changing the New Source Performance Standards (NSPS) of the Clean Air Act;
- o Proposed Acid Rain Legislation;
- o Market Development through Private Investment in Transportation;
- o Potential Impacts of the Construction of Coal Slurry Pipelines; and
- o Proposed Changes in Waterway User Fees.

The data for this study was developed by the Illinois Department of Transportation. The primary research sources were published documents, a survey of Illinois utilities and out-of-state utilities that use Illinois coal conducted January through March 1982, and discussions with transportation carriers and coal mining companies conducted April through October 1982.

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CHAPTER ONE

FINDINGS AND CONCLUSIONS

Illinois is a major coal producer and consumer. In 1980, Illinois mines produced 62.5 million tons of coal which was sold primarily to utilities in the Midwest and the Southeast. In the same year, Illinois utilities burned 34 million tons of coal. The primary sources of this coal were Illinois (53 percent) and Western mines in Montana, Wyoming and Colorado (42 percent).

While Illinois is the fifth largest coal producing state in the nation, the high sulphur content of its coal has limited the State's markets over the past decade and will continue to do so in the future. Specifically, potential federal environmental legislation could greatly influence the marketability of Illinois coal to utilities. In terms of transportation, additional federal legislation concerning waterway user fees and coal slurry pipelines could also influence the marketing of Illinois coal.

In the long-term future, the use of Illinois coal depends on technological developments that reduce sulphur dioxide emissions. Both domestic and foreign utilities must meet increasingly stiff air emission standards, which limit the use of Illinois coal as a fuel.

ENVIRONMENTAL LEGISLATION--POTENTIAL IMPACTS ON ILLINOIS COAL

The 1970 Clean Air Act required utilities to meet maximum emission standards for sulphur dioxide and other contaminants. To meet these standards, utilities faced a choice of either installing flue gas desulphurization systems in order to continue burning high sulphur coal, switching to low sulphur coal or building new plants that use other types of fuel. As a result of these new federal requirements, some major midwestern utilities began shifting to low sulphur Western coal. In Illinois, some major users began making plans for heavier reliance on nuclear power in the 1980s.

Two types of environmental legislation introduced in the last session of Congress could severely limit future markets for Illinois coal. "Acid Rain" legislation would require utility plants constructed prior to 1978 to meet stricter sulphur dioxide emission standards than those now in the 1970 Clean Air Act. Other environmental legislation is aimed at amending the Clean Air Act to eliminate the percentage reduction requirement for sulphur dioxide emissions.¹ Many utilities and some Western states

¹ The 1978 New Source Performance Standards (NSPS) in the Clean Air Act call for all coals to be scrubbed regardless of sulphur content. NSPS calls for a 90 percent reduction in sulphur dioxide emission for high sulphur coal and a 70 percent reduction for low sulphur coal. This requirement is in addition to other standards for reduction levels for sulphur dioxide emissions.

oppose this requirement, since most low sulphur coals already meet the original air emission requirements for new plants. They contend that the percentage reduction requirement for low sulphur coal is a protection for high sulphur coal markets. The passage of either the "Acid Rain" legislation or the amendment eliminating the percentage reduction requirement in the Clean Air Act would have a devastating impact on the Illinois coal industry by severely limiting the markets for Illinois coal.

TRANSPORTATION LEGISLATION

In addition to environmental legislation, transportation legislation that could affect domestic coal markets may be introduced in the next session of Congress. This legislation includes the implementation of additional waterway user fees and the granting of eminent domain for the construction of interstate coal slurry pipelines.

Inland Waterway User Fees

Two issues have been raised concerning the implementation of inland waterway user fees to pay for operations and maintenance costs: (1) How should the costs be assigned and collected on the system--should costs be assigned on a segment-by-segment or on a systemwide basis? and (2) What portion of the costs should be recovered through user fees?

Two basic methods for assigning costs to the Inland Waterway System are being considered: (1) a segment-by-segment approach, whereby user fees would be calculated and collected according to the costs for operating, maintaining and improving each segment; and (2) a system-wide approach, whereby the total costs for the whole system would be distributed evenly over the entire system.

The impacts of how increased user fees would affect Illinois coal terminals vary depending on the terminal location within Illinois and the destination of the coal. For example, a terminal in Southern Illinois shipping coal to a utility in Dubuque, Iowa would probably incur lower costs if a systemwide approach were used. This is due to the relatively high operational costs and low traffic volumes on the Upper Mississippi River. Shipments originating from the same coal terminal destined to utilities south would probably incur lower costs under a segment fee, since the Lower Mississippi has relatively low operational and maintenance cost and a high traffic volume.

While any level of user fee may increase the delivered price of Illinois coal, no major diversions from Illinois suppliers are expected. Illinois coal delivered by barge currently maintains a sufficient price advantage in several Midwestern and Southeastern states to offset a user fee. In addition, most of these states have fuel adjustment clauses which allow utilities to pass transportation cost increases on to consumers. Water-competitive railroad rates may also rise in response to increases in barge rates due to a user fee. Increases in rail rates would minimize traffic diversions from the waterways.

Eminent Domain for Coal Slurry Pipelines

In 1983, it is anticipated that Congress will again consider legislation which would create the authority for the federal government to grant eminent domain for the construction of interstate pipelines. The eminent domain legislation raises the issue of equity in the federal government's role in promoting different modes of transportation. Nationally, pipelines can be expected to divert traffic that would otherwise be carried by railroads. This anticipated diversion raises the question as to whether Congress' efforts to promote the economic health of the rail industry through deregulation under the 1980 Staggers Act would be undermined by eminent domain legislation promoting pipelines.

One pipeline, currently in the planning stage, which is dependent upon eminent domain legislation for obtaining right-of-way, is the Coalstream pipeline between Illinois and Florida.² This pipeline would also serve Georgia utilities and mines in Western Kentucky, Indiana, West Virginia, Ohio and Pennsylvania. At this early stage in planning, it is uncertain whether the leg of the pipeline extending into Illinois would be built or not.

Although the pipeline may create a new mode for transporting Illinois coal to the Southeast, no major market expansions should be expected as a result of its construction. Illinois coal already under long-term contract to Georgia and Florida utilities comprises approximately 60 percent of the high-sulphur coal projected to be burned by utilities in these two states in 1990. The Coalstream pipeline, if constructed into Southern Illinois, would not significantly increase access to plants with the capability of burning high sulphur coal. In addition, the railroad and barge facilities currently used for transporting Illinois coal to Georgia and Florida have the capacity to accommodate the projected 1990 traffic.

In terms of rate competition with railroad and barges, pipeline rates may or may not be detrimental to Illinois coal's competitive position in the Southeast. Generally, coal produced in Illinois, Western Kentucky and Indiana is cheaper at the mines than Appalachian coal. This advantage is enhanced by relatively low-cost water transportation but offset by higher scrubbing costs. However, it is safe to assume that due to the closer location, Kentucky coal of similar quality and price as Illinois coal could be shipped to the Southeast via pipeline at a lower cost than Illinois coal also shipped via pipeline. Appalachian coal delivered to Southeastern markets via pipeline could erode sales of Illinois coal delivered via rail-barge if the pipeline could offer a more competitive rate. Currently, Illinois coal delivered to Florida via rail-barge has a

² Eminent domain legislation is not needed to construct the proposed Energy Transportation Systems, Inc. (ETSI) pipeline between Wyoming and Arkansas. The major issue for ETSI is the legal challenge to the State of South Dakota's right to sell ETSI water. Since Illinois coal is not competitive in the states directly served by ETSI, no major impacts are anticipated if the pipeline were built.

\$7/ton price advantage over Appalachian coal of similar quality delivered via rail.³ In summary, the Coalstream pipeline and the required eminent domain legislation would not be in the best interest for the State of Illinois.

CONGRESSIONAL ACTION

The timing of Congressional action on environmental and transportation-related legislation will determine the character of U. S. coal markets and of the coal distribution system through 1990. The earliest possible action that could be taken would occur during the 1983 session of Congress. Regarding environmental legislation, it is anticipated that a phased approach for compliance would be used for any laws which would dramatically change domestic coal marketing patterns. Thus, major impacts would not be expected to occur until the 1990s.

POTENTIAL EXPORT MARKETS FOR ILLINOIS COAL

Foreign exports of Illinois coal represent a new market with limited potential for growth this decade. As in domestic markets, Illinois coal's usefulness in Europe and Eastern Asian countries is limited by its high sulphur content. Countries in these markets typically have environmental standards comparable or stricter than those in the United States. The Southern European cement industry, which produces dry cement that can absorb some sulphur dioxide during processing, is a primary market for Illinois coal. In 1981, the first year for Illinois export shipments, 640,000 tons were exported via the port in New Orleans to Spain and Japan. Export levels through 1990 could reach 2-3 million tons per year, but this would represent only 5 percent of Illinois' total annual production. Because the Port of Chicago cannot offer competitive rates to Europe due to Great Lakes freight charges combined with the lock size limitations on the St. Lawrence Seaway, exports of Illinois coal will continue to move through New Orleans.

OUTLOOK FOR ILLINOIS' COAL TRANSPORTATION SYSTEMS

Efficient, reliable transportation is important to both the coal industry and coal-fired utilities in Illinois. Railroads and rail-barge combinations are projected to continue to carry over 80 percent of the coal traffic in the State through 1990. Currently all major railroad coal routes are capable of carrying 100-ton cars, typically used in unit train operations, and Illinois' inland waterway system has the capacity to handle more than the projected increase in traffic by 1990. Within the State, conveyors and highways are important for several key coal movements. During the mid-eighties, truck traffic is expected to increase and be concentrated on fewer routes. Looking to 1990, no major shifts are expected in the transportation system that will be used to transport coal within Illinois and no major system problems are anticipated.

³ Subhash Bhagwat, Illinois State Geological Survey.

CHAPTER TWO

COAL PRODUCTION AND CONSUMPTION TRENDS

This chapter provides background on Illinois coal reserves and production, coal consumption by Illinois utilities, domestic markets for Illinois coal and an analysis of Illinois coal's export potential. Major facts and trends include:

- o Illinois has 68 billion tons of demonstrated coal reserves, placing it second only to Montana. However, Illinois coal is typically high in sulphur, which some utilities must remove through a scrubbing process.
- o Based on the 1981 production of 54 million tons, Illinois ranks fifth nationally behind Kentucky, West Virginia, Wyoming and Pennsylvania.
- o Over the past decade, Illinois coal's major competition has been Western coal. Shifts away from the use of Illinois coal in favor of Western coal were precipitated by the 1970 Clean Air Act. Within Illinois, nuclear power will increase and is expected to become a major competitor in the mid-eighties.
- o In 1980, over 80 percent of the Illinois coal produced was burned by utilities; the major market states were Illinois, with 34 percent of the total production, Missouri with 22 percent and Indiana with 19 percent.
- o Assuming that stricter environmental standards are not enacted into law this decade, shipments of Illinois coal to Illinois destinations are expected to remain stable, while increases are expected in shipments to Missouri, Indiana and Florida.
- o In the short-term future, the competitive position of Illinois coal in domestic markets will be determined by air quality standards. Proposed changes to make these standards stricter could be devastating to the Illinois coal industry.
- o Due to the high air quality standards of most European and Eastern Asian countries and the relative price advantage of other suppliers, Illinois is not expected to become a major supplier of coal for foreign utilities in the short-term future.
- o In 1981, Illinois producers exported 640,000 tons of coal to Spanish and Japanese cement manufacturers. Although the potential exists for developing the cement manufacturing export market for Illinois coal, the growth is not anticipated to exceed 5 percent of Illinois' annual production by 1990.
- o The long-term future for Illinois coal in domestic and export markets is highly dependent upon technological advances which will minimize the costs of cleaning high sulphur coal to meet environmental standards.

- o Over the past few years, the State of Illinois has appropriated \$66.375 million for research and experimental projects on coal technologies. Of the total appropriation, \$20 million has been granted.

ILLINOIS COAL RESERVES AND PRODUCTION

Illinois has nearly 68 billion tons of demonstrated coal reserves, placing it second only to Montana. From a user's perspective, Illinois coal generates more heat per pound burned than most Western coals, but requires an additional pollution control cost to reduce sulphur dioxide emissions. In comparison to Western and Eastern coals, Illinois coal is typically higher in sulphur and heat content.⁴

Illinois currently ranks fifth in United States coal production. Relative state rankings are shown in Table 1. In 1980, Illinois produced 62.5 million tons. Production for 1981 declined 14 percent from the previous year due to a United Mine Workers strike. Due to the recession, the 1982 production is also not expected to reach the 1980 level.

TABLE 1
TOP COAL PRODUCING STATES IN 1981
(Millions of Tons)

	<u>Tons</u>	<u>%</u>
1. Kentucky	155	19.3
2. West Virginia	109	13.5
3. Wyoming	104	13.0
4. Pennsylvania	66	8.2
5. ILLINOIS	54	6.7
6. Virginia	46	5.8
7. Montana	34	4.3
8. Ohio	34	4.2
9. Texas	33	4.1
10. Indiana	28	3.5
Total Top 10 States	663	82.6%
Total United States	803	100%

Source: 1981 Keystone Coal Industry Manual

⁴ For the purpose of this study, low sulphur coal is defined as one percent or less in sulphur content, and high sulphur is defined as over one percent. Illinois coal is typically 2-5 percent sulphur and 9,700-12,800 BTUs/lb., whereas Western coal is usually less than one percent sulphur and 6,000-11,000 BTUs/lb., and Eastern coals vary in sulphur content and heat content.

ILLINOIS COAL VERSUS OTHER ENERGY SOURCES

In 1976, coal was the primary fuel used by electric utilities by nearly a three to one margin over oil. Utilities used coal to generate 47 percent of the 3 trillion kilowatt hours of electricity in the U. S. Oil, the second largest fuel source, generated 16 percent, natural gas and hydro-electric generated 14 percent each and the remaining 9 percent was generated by nuclear power. As shown in Table 2, nuclear power is the only fuel source projected to grow through the Year 2000 relative to other fuels. Coal usage will level off to about 50 percent of kilowatt-hour generation; nuclear will supply about 25 percent and the remainder will be supplied by oil, gas and hydroelectric. Even though coal usage seems to have peaked, coal will actually take 50 percent of a growing market as electrical energy is projected to increase from 2 trillion kilowatt-hours in 1976 to 3.6 trillion kilowatt-hours by the Year 2000.

TABLE 2
ELECTRICITY GENERATION BY FUEL TYPE

<u>Year</u>	<u>Total Billions Kilowatt Hours</u>	<u>Coal</u>	<u>Oil</u>	<u>Gas</u>	<u>Nuclear</u>	<u>Hydro</u>
1976	2,032	47%	16%	14%	9%	14%
1985	3,010	51%	11%	7%	19%	12%
2000	3,616	51%	8%	5%	26%	10%

Source: The President's Commission on Coal, Coal Data Book, 1980 pg. 42.

Over the past decade, the demand for high sulphur coal was weakened by the Clean Air Act of 1970, which requires utilities to meet maximum emission standards for sulphur dioxide and other contaminants. To meet these new standards, utilities either began burning low sulphur coal or installed flue gas desulphurization systems (scrubbers). When they were first introduced, scrubbers were extremely costly and not very reliable.

In the Midwest utility market, Illinois coal, in comparison to Western coal, has the advantage of low transportation cost due to its geographic location, but the disadvantage of higher production costs. Transportation costs represent 15-30 percent of the delivered price of Illinois coal, as opposed to 30-90 percent for Western coals. The production costs for Illinois coal are higher than Western coal due to the type of mining operation. Using the price of coal at the mine as an indicator of production costs, in 1977 the average cost per ton for Illinois coal from underground mines was \$18.34 and from surface mines it was \$15.99. In comparison, Montana coal averaged \$5.93 and Wyoming coal averaged \$8.14. From the perspective of a Midwestern utility, Illinois coal competes well with Western coal on delivered price basis, but the added cost of scrubbing high sulphur coal must also be taken into account.

Currently, the demand for all coals has weakened as a result of reduced residential and industrial use of electricity. This drop in electrical usage was caused by energy conservation measures and the current recession.

CONSUMPTION OF COAL BY ILLINOIS UTILITIES

Traditionally, coal has been a major fuel used by Illinois utilities and a major portion of that coal has been mined in Illinois. However, over the past decade, coal use has been declining and reliance on nuclear power has been increasing. In 1960, coal-fired plants produced 89 percent of the energy at Illinois utilities. By 1970, coal-generated electricity had dropped to 75 percent. As shown on Table 3, this declining trend for coal use by Illinois utilities is leveling off in the 1980s. In 1979, 69 percent of the electricity generated by utilities was produced by coal-fired plants. In 1984 coal-fired plants are projected to supply approximately the same level of power, but will represent a smaller percentage of the total electricity produced. Nuclear power is expected to account for the majority of growth in the generation of electricity during the mid and late 1980s.

In addition to the decline in use of coal to generate electricity, there also was a shift from use of Illinois coal to use of Western coal. Prior to the Clean Air Act of 1970, most of the coal burned in Illinois was mined in Illinois. By 1979 only 55 percent of the coal burned by Illinois utilities originated in the State.

The shift from use of Illinois coal to Western coal can best be illustrated by Commonwealth Edison, which currently receives approximately 85 percent of all of the Western coal shipped to Illinois utilities. As shown on Table 4, Illinois coal represented 38 percent of Commonwealth Edison's coal purchases in 1976, but only 13 percent in 1981.

TABLE 3

ILLINOIS UTILITY FUEL CONSUMPTION BY FUEL TYPE
(1960-1984)

Type of Fuel	1960		1970		1979		1984	
	Trillion BTUs/Year	% Total	Trillion BTUs/Year	% Total	Trillion BTUs/Year	% Total	Trillion BTUs/Year	% Total
Illinois Coal	(a)	(a)	(a)	(a)	544	38%	547	31%
Western Coal	(a)	(a)	(a)	(a)	359	25%	366	21%
Other Coal ^b	(a)	(a)	(a)	(a)	95	5%	64	4%
TOTAL COAL	417	89%	611	75%	998	69%	977	55%
Nuclear	(c)	(c)	24	3%	310	22%	736	42%
Oil	8	2%	41	5%	100	7%	52	3%
Natural Gas	42	9%	139	17%	34	2%	3	-
TOTAL FUELS	467	100%	815	100%	1,442	100%	1,768	100%

a The breakout for the sources of coal was not available. However, since no air quality standards existed and since Western mines were not developed as they are today, it is assumed that the majority of the coal was from Illinois or other Midwestern states.

b Kentucky and Indiana.

c Nuclear and oil were combined in 1960 data.

Source: Illinois Department of Energy and Natural Resources, Illinois Energy Plan, 1982, PP. 24 and 31.

TABLE 4

COAL USE BY COMMONWEALTH EDISON (1976-1981)^a
(Millions of Tons)

Year	Western Coal		Illinois Coal		Total Tons
	<u>Tons</u>	<u>% Total</u>	<u>Tons</u>	<u>% Total</u>	
1976	10.7	62%	6.6	38%	17.3
1977	11.5	65%	6.3	35%	17.8
1978	11.2	69%	5.1	31%	16.3
1979	12.7	81%	3.0	19%	15.7
1980	13.0	83%	2.6	17%	15.6
1981	13.6	87%	2.0	13%	15.6

^a All plants are not located in Illinois; the Stateline plant is located in Indiana.

Source: Coal Age, July 1982, p. 19.

Based on a review of long-term coal contracts with Illinois utilities, the shift toward use of Western coal is not expected to continue into the eighties. Although utility dependence on coal will decrease as new nuclear plants come on line, in terms of actual tonnage, use of coal is expected to continue at about the same level. Coal used by Illinois utilities under long-term contract in 1980 and 1990 is shown on Table 5. The decrease in Western coal under contract in 1990 is due to the termination of some contracts between 1985 and 1990.

TABLE 5

SOURCES OF COAL UNDER LONG-TERM CONTRACT FOR ILLINOIS UTILITIES
(Thousands of Tons)

<u>Source</u>	<u>Actual Traffic 1980</u>	<u>Long-Term Contracts^a</u>	
		<u>1980</u>	<u>1990</u>
Illinois	17,829	16,046	17,575
Western	14,152	14,102 ^a	11,650
Mid-Western	<u>1,933</u>	<u>1,091</u>	<u>325</u>
Total	33,914	31,239	29,550

^a For the purpose of the analysis, it was assumed that all contracts would run for their full term, i.e.: 20-30 years, and that no options for early terminations, such as those available under a reopener clause, would be exercised.

Source: Illinois Department of Transportation survey.

DOMESTIC MARKETS FOR ILLINOIS COAL

In 1980, over 80 percent of Illinois coal was shipped to utilities. The major market states include Illinois which received 34 percent of the total production, Missouri which received 22 percent and Indiana which received 19 percent. Utilities and industries in these three states purchased 75 percent of all Illinois coal mined that year. The 1980 market distribution by user is shown in Table 6.

Long-term utility coal contract purchases are shown for 1980 and 1990 in Table 7. Based on the coal under contract for delivery in 1990, the market distribution among states should remain relatively stable, with market increases primarily in Missouri, Indiana and Florida. In terms of tonnage, Illinois utilities can be expected to receive cooperatively the same level, but as other market states receive increased tonnages, Illinois' importance as a market will decline.

ENVIRONMENTAL ISSUES AFFECTING USE OF HIGH SULPHUR COAL

There are several bills before Congress whose outcome will affect coal use in the United States. The outcome could potentially eliminate major market segments where Illinois coal is currently economical. Issues that could potentially impact Illinois' coal industry include:

- o Enforcement of Existing Air Quality Standards
- o Legislation proposing changes to the New Source Performance Standards (NSPS)
- o Acid Rain Legislation

TABLE 6

1980 MARKET DISTRIBUTION FOR ILLINOIS COAL BY STATE AND USER
(Thousands of Tons)

	Tons to Utilities		Tons to Other Users ^a		Total Tonnage	
	Long-Term Contract	Short-Term Contract or Spot	Total	All Contracts or Spot	Tons	% Total ^c
Illinois	16,046	1,783	17,829	932	18,761	34%
Missouri	9,046	2,543	11,589	589	12,178	22%
Indiana	6,981	1,149	8,130	2,532	10,662	19%
Georgia	4,980	0	4,980	0	4,980	9%
Wisconsin	2,242	1,141	3,383	235	3,618	6%
Iowa	789	648	1,437	373	1,810	3%
Florida	1,967	0	1,967	0	1,967	4%
Minnesota	710	218	928	233	1,161	2%
Michigan	0	215	215	98	313	1%
Alabama	0	156	156	0	156	-
Kentucky	0	126	126	0	126	-
Tennessee	0	122	122	0	122	-
Mississippi	0	113	113	0	113	-
TOTAL	42,761	8,214	50,975	4,992	55,967 ^b	100%

a "Other Users" includes industries, retail and coal moving to unidentified plants. Some Southern Illinois metallurgical coal destined to Chicago area steel plants is included in this category. No coke shipments are included.

b Study tonnage of 55.967 million tons represents 90 percent of the total 62.5 million ton 1980 production.

c Percentages do not add due to rounding.

Source: Illinois Department of Transportation survey.

TABLE 7

1980 AND 1990 UTILITY MARKET DISTRIBUTION FOR ILLINOIS COAL BY STATE
(Thousands of Tons)

<u>State</u>	<u>1980 Long-Term Contracts</u>		<u>1990 Long-Term Contracts</u>	
	<u>Total Tons</u>	<u>% Total</u>	<u>Total Tons</u>	<u>% Total</u>
Illinois	16,046	38%	17,575	32%
Missouri	9,046	21%	15,580	28%
Indiana	6,981 ^a	16%	9,505	17%
Wisconsin ^a	2,242	5%	35	--
Georgia	4,980	12%	5,000	9%
Iowa	789	2%	2,025	4%
Florida	1,967	5%	5,250	9%
Minnesota ^b	<u>710</u>	<u>2%</u>	<u>295</u>	<u>--</u>
TOTAL ^c	42,761	100%	55,265	100%

^a A review of Wisconsin utility coal contracts for Illinois coal indicates there are 2.185 million tons of coal under contract for 1985.

^b For 1985, Minnesota utilities have 760 thousand tons of coal under contract. Therefore, no major market share change is expected through 1985 and maybe not through 1990, since contracts may be renegotiated.

^c Total 1980 production was 62.5 million tons. Of the 1980 study total, 43 million was identified as coal under long-term contract with utilities.

Source: Illinois Department of Transportation survey.

Enforcement of Existing Air Quality Standards

Under the Clean Air Act of 1970, utilities built prior to September 18, 1978 must comply with varying emission standards depending on each plant's age, proximity to large urban centers and stack height.⁵ The market for approximately 6.5 million tons of Illinois coal could be lost if utilities currently not complying with sulphur dioxide standards switch entirely to Western coal to comply with the Clean Air Act. This would represent a reduction of 10 percent of the total Illinois coal production. It is more likely these utilities will begin blending greater amounts of lower sulphur coal, while reducing their usage of high sulphur coal. Little, if any, Illinois coal will be lost as a result of non-compliance to standards for particulate matter.

The original date for compliance with the existing air quality standards was December 31, 1982. As of March 1983, no extension to this deadline had been granted, except for utilities with a court approved compliance plan. The issue of compliance is still subject to future EPA and Congress action.

Proposed Changes to the New Source Performance Standards (NSPS)

On September 18, 1978 the New Source Performance Standards in the Clean Air Act were revised to require all coals to be scrubbed regardless of their sulphur content. Currently the NSPS requires a 90 percent reduction in sulphur dioxide emissions at plants burning high sulphur coal and a 70 percent reduction at plants burning low sulphur coal.

Recent proposed changes to the NSPS would eliminate the percentage reduction requirement. Many utilities oppose the current percentage reduction standards as being too harsh on low sulphur coals that would already meet the original air emission requirements set in 1970 for new plants. For Illinois, the percentage reduction standards have allowed the State's coal producers to maintain a competitive position for orders from new utility plants, particularly in Florida, and have also served to promote research into technologies that would allow increased burning of high sulphur coal. If the percentage reduction requirement were eliminated, Illinois could lose substantial present and future markets.

⁵ Steel mills are covered by separate legislation and were given a three-year extension on compliance on a case-by-case basis. Although several extensions have been sought, no Chicago plants have been granted one. U. S. Steel in Chicago is not in compliance with standards for particulate matter.

Acid Rain Legislation

Other legislation that Illinois coal producers will watch closely is "Acid Rain" legislation. The underlying assumption for the acid rain legislation is that Midwestern utility plants built prior to 1970 are major contributors to acid rain in Northeastern states. To reduce the acid rain problem in the Northeast, the legislation would bring all utilities under stricter sulphur dioxide emission standards. If acid rain legislation were enacted in the 1983 congressional session, the Illinois Environmental Protection Agency estimates that one-half of Illinois' production could lose its markets.

POTENTIAL FOR DEVELOPING EXPORT MARKETS FOR ILLINOIS COAL

While steam coal exports from the United States have been booming for the past two years, Illinois mines have not had a major role in supplying the European and Eastern Asian countries. In 1981 approximately 640,000 tons of Illinois coal was exported. Based on discussions with mining and transportation companies, an optimistic forecast for exports in 1990 would be 2-4 million tons, which would only represent about 5 percent of Illinois coal production. In comparison to the anticipated 1990 Midwestern and Southeastern markets, exports cannot be characterized as a major market.⁶

A potential export market for Illinois coal in the 1980s is the cement industry in Southern Europe. As shown on Table 8, high sulphur Illinois coal could meet the sulphur standards for the cement industry in Spain, France and Greece. Based on an Illinois Central Gulf Railroad (ICG) country-by-country study of the Southern European countries, the cement coal import requirements for 1985 and 1990 are 16.5 million tons/year and 19.0 million tons/year, respectively.⁷ Based on ICG estimates, the delivered price for Illinois coal could be competitive with other U. S. suppliers. The ICG estimated the delivered price of Illinois coal to Rotterdam in 1981 as \$57.75-69.58 as compared to \$61.97-69.87 for Eastern coal via Norfolk and Western Railway (N&W) or Chessie System to Eastern ports.

⁶ Assuming an average annual production of 60 million tons, the Midwest states would consume 78 percent of total production, Southeastern states 17 percent, and only 5 percent for exports.

⁷ Illinois Central Gulf, The World Coal Export Market, July 1981.

While Illinois coal is competitive for the cement industry in several European countries, Illinois coal for utilities is not currently competitive in any of these countries. Most European countries have air quality standards for utilities that are similar or stricter than U. S. standards. As shown in Table 8, most Illinois coal would be unacceptable to utilities in France, Greece, Italy and Spain. European countries also have better access to Polish, Australian, South African and Eastern U. S. coals than to Illinois coal. Poland in particular is currently offering low sulphur coal at prices \$10 to \$15 per ton less than Eastern U. S. coals.

TABLE 8
COMPARISON OF ILLINOIS COAL QUALITY TO COAL SPECIFICATIONS
IN SOUTHERN EUROPEAN COUNTRIES

	<u>Heating Value (BTU/lb.)</u>	<u>Sulphur (%)</u>
<u>Illinois Coal</u>	11,500	(a)
<u>France</u>		
Utilities	11,520	1.8
Cement	10,800(Min.)	2.1
<u>Greece</u>		
Utilities	11,700	1.5
Cement	10,800	3.0
<u>Spain</u>		
Utilities	11,700	0.8-1.5
Cement	10,800(Min.)	2.0-2.5
<u>Italy</u>		
Utilities	11,520	0.7-0.8
Cement ^b	10,800(Min.)	1.0

a In 1981 about 48.7 million tons of coal produced had a 2 percent sulphur content or greater, 5.6 million tons was 1.5 to 2 percent and 8.2 million tons had less than 1.5 percent.

b There have been efforts to reduce the standard to allow 3 percent sulphur, pending action in 1982.

Source: Illinois Central Gulf Railroad, The Evolution of the International Coal Trade: A Strategic and Decision-Making Perspective, pp. 13 and 15.

STATE-SUPPORTED RESEARCH ON ILLINOIS COAL

The State of Illinois is committed to funding research and experimental technologies aimed at reducing the major constraint on the use of Illinois coal--its high sulphur content. State funds are presently provided through two sources: the Coal and Energy Development Bond Fund, a program created in 1974 to finance the development of new energy resources and technologies; and the Illinois Coal Research Board, which funds basic research on technologies utilizing Illinois coal.

The first project funded through the Coal and Energy Development Bond Fund was a grant for Combustion Engineering, Inc. to develop a fluidized-bed boiler at the Great Lakes Naval Training Station near Chicago. The Coal Bond Fund contributed \$750,000 to the \$25.7 million project. Other contributors were the U. S. Department of Energy, the Navy, and Combustion Engineering. The plant began operating in 1981.

In 1979 the State awarded \$18 million from the Coal Bond Fund as a contribution to a \$155 million Kilngas project. The coal gasification project is under construction at Illinois Power's Wood River generating station and is targeted for completion in 1983. Funds for this project were also provided by Allis-Chalmers (\$80 million), Illinois Power (\$5.5 million) and the Electric Power Research Institute (\$5.5 million).⁸

In 1982, three projects were awarded. B. F. Goodrich in Henry received a \$4.3 million State grant for its \$21.3 million project to develop a circulating fluidized bed boiler. Midwest Solvents in Pekin received a \$2.5 million State grant for its \$12 million project to develop a fluidized bed boiler. The University of Illinois' Abbott Power Plant received total funding of \$21.9 million to install a flue-gas desulphurization scrubber system from the Bond Fund (\$4.95 million) and from the Capital Development Bond Fund (\$16.95 million). In January of 1983, Allis Chalmers was granted \$6 million as a contribution to a \$36 million project to install a combustion turbine at Illinois Power's Wood River Plant. The Coal Development Bond Fund projects are summarized on Table 9.

In 1982, the General Assembly created the Illinois Coal Research Board and gave the Board an appropriation of \$1.0 million. In 1983, that appropriation was increased to \$1.375 million. The Board recently selected seven projects. The largest grant (\$850,000) was awarded jointly to the Illinois Geological Survey, the University of Illinois and Southern Illinois University to establish a Center for Research on Sulphur in Coal. The seven projects are listed on Table 9.

⁸ Energy Power Research Institute (EPRI) is a research organization representing and supported by utility companies nationwide for the development of improved electrical generating technology.

TABLE 9
STATE FUNDED COAL RESEARCH PROJECTS

<u>Program/Recipient</u>	<u>Project</u>	<u>Grant</u>
<u>Coal and Energy Development</u> <u>Bond Fund^a</u>		
Combustion Engineering	Develop a fluidized-bed boiler (Total Cost: \$25,700,000)	\$ 750,000
Allis Chalmers	Develop a Kilngas boiler (Total Cost: \$155,000,000)	<u>18,000,000</u>
		\$18,750,000
<u>Coal Research Board^b</u>		
State Geological Survey, University of Illinois Southern Illinois University	Establish Center for Research on Sulphur in Coal	\$ 850,000
Southern Illinois University, State Geological Survey	Removal of organic sulphur from Illinois Coal using a catalyst generated from pyrite present in coal	118,630
Illinois State University	Removal of organic sulphur from Illinois coal using inexpensive chemicals	53,357
University of Chicago	Use of organic compounds in coal as catalysts for coal conversion reactions	132,023
Institute of Gas Technology	Explore the potential of a microbiological coal desulphurization process	89,762
Institute of Gas Technology	Advanced coal cleaning methods	77,154
Eastern Illinois University	Study increasing basic knowledge of Illinois coal and its use in liquefaction processes.	21,772
		<hr/> \$ 1,342,698

^a The total appropriation for the Bond Fund is \$70 million, of which \$65 million was designated for coal projects; \$5 million was designated for alternative energy development projects.

^b The total appropriation for the Coal Research Board is \$1.375 million.

Source: Illinois Department of Energy and Natural Resources.

SUMMARY

Although Illinois is a major coal producer with vast reserves, the potential for domestic and export market increases in the near future are limited by the coal's high sulphur content. The Clean Air Act of 1970, with its sulphur emission standards, caused shifting in markets over the past decade. Illinois coal has faced increased competition from low sulphur Western coals in the Midwest and will face an increase in competition from nuclear power in Illinois through the Year 2000. Slight market increases in the Southeast are occurring as Florida utilities phase out gas-fired and oil-fired plants and construct new coal-fired plants with scrubbing systems. However, the marketability of Illinois coal could be further reduced if any Acid Rain legislation or certain amendments to the New Source Performance Standards in the Clean Air Act were enacted. The outcome of this legislation will, in a large part, determine the future for Illinois coal in domestic markets.

Export markets are also limited by the high sulphur content of Illinois coal. Many European and East Asian countries have stricter air quality standards than the United States. The potential exists for developing the cement industry market in Southern Europe, but major marketing efforts will be required. For the short-term future, exports are not expected to develop beyond a small market segment, representing about 5 percent of production. The long-term future is dependent on the development and implementation of new technologies at domestic and foreign utilities, which would then allow the economical burning of high sulphur coal.

CHAPTER THREE

TRANSPORTATION OF COAL WITHIN ILLINOIS

MODAL DISTRIBUTION OF 1980 COAL TRAFFIC IN ILLINOIS

Railroads and rail-barge combinations serve as the primary means of transporting coal for Illinois. In 1980, these two modes carried 81 percent of the State's coal traffic. This traffic was primarily Illinois coal being transported to Midwestern destinations and Western coal destined for Illinois. The 1980 modal distribution of coal traffic destined for or originating in Illinois is shown in Table 10.⁹

Illinois Coal

Illinois-produced coal comprised 78 percent of the 1980 coal tonnage. As shown in Table 11, the major markets for Illinois-produced coal are the Midwest, where Illinois, Missouri and Indiana received 70 percent of this coal in 1980, and the Southeast, where Georgia and Florida received 12 percent of Illinois' total production.

Railroads are key to transporting Illinois-produced coal to market. Over 46 million tons of the State's 1980 production was delivered at least in part by rail to market. The development of unit train operations has provided shippers with a relatively cheap method for delivering large volumes of coal over land to market. The primary railroads originating coal traffic from Illinois mines in 1980 were the Missouri Pacific and the Illinois Central Gulf. These two carriers transported 66 percent of Illinois coal moved by railroads in 1980. Other major coal hauling railroads in Illinois are the Burlington Northern, Chicago and Northwestern and Southern.

For Illinois mines, direct rail service provides a sufficiently low transportation cost to allow effective marketing in Illinois, Missouri and Indiana. In 1980, direct rail deliveries from Illinois mines to utilities in these three states amounted to 27 million tons or 47 percent of the State's entire production that year. In total, 32 million tons were delivered to market directly by rail.

Railroads are also important components in reaching markets served by barge transportation. In 1980, nearly 14 million tons of Illinois coal moved by railroad to river terminals, where it was transloaded onto barges. The majority of this traffic was delivered to utility plants by barge via the inland waterways system.

⁹ Overhead traffic moving through Illinois that neither originates nor terminates in Illinois is not included.

TABLE 10

1980 COAL TRAFFIC WITHIN ILLINOIS^a
(Thousands of Tons)

<u>Carrier</u>	<u>IL Coal Destined Out-of-State</u>	<u>Coal Destined for Illinois by Source</u>			<u>Total Coal</u>	<u>% Total</u>
		<u>Illinois</u>	<u>WY, MT, CO</u>	<u>KY, IN</u>		
Railroad	25,172	6,900	10,652	62	42,786	57%
Rail-Barge	13,128	814	3,500	1,400	18,842	25%
Truck	90	3,032	0	406	3,528	5%
Truck-Barge	778	0	0	65	843	1%
Conveyor-Plant	0	8,015	0	0	8,015	11%
Barge	<u>1,080^b</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,080</u>	<u>1%</u>
Total	40,248	18,761	14,152	1,933	75,094	100%

^a Overhead traffic moving through Illinois is not included. Since short-term contract and spot purchases by utilities and industrial traffic is included, these totals may not correspond with those in other tables.

^b Conveyor from mine to dock.

Source: Illinois Department of Transportation survey.

TABLE 11

1980 MARKET DISTRIBUTION OF ILLINOIS COAL BY MODE
(Thousands of Tons)

Destination	Railroad	Rail-Barge	Truck	Truck-Barge	Conveyor-Plant	Conveyor-Barge	Total
Illinois	6,900	814	3,032	0	8,015	0	18,761
Missouri	10,069	2,079	30	0	0	0	12,178
Indiana	10,662	0	0	0	0	0	10,662
Wisconsin	2,570	1,048	0	0	0	0	3,618
Georgia	0	4,980	0	0	0	0	4,980
Iowa	951	799	60	0	0	0	1,810
Florida	0	500	0	500	0	967	1,967 ^a
Minnesota	696	465	0	0	0	0	1,161
Michigan	98	215	0	0	0	0	313
Alabama	0	0	0	156	0	0	156
Kentucky	126	0	0	0	0	0	126
Tennessee	0	0	0	122	0	0	122
Mississippi	0	0	0	0	0	113	113
Unspecified ^b	0	3,042	0	0	0	0	3,042
TOTAL	32,072	13,942	3,122	778	8,015	1,080	59,009

^a Anticipated growth in the Florida market is expected to reach 5.3 million tons/year by 1985; the coal would be transported via rail-barge.

^b Tonnage reported as moving from mine to Mississippi or Kaskaskia River docks via railroad for unknown destinations.

Source: Illinois Department of Transportation survey.

The inland waterway system provides a low-cost means of reaching Southeastern coal markets in Georgia and Florida. In 1980, almost 5 million tons of coal were transported to Georgia via rail-barge. This coal moved by rail to either the Mississippi or Ohio Rivers where it was transloaded to barge, then moved south via the Tennessee River to Alabama where it was loaded back into unit trains and delivered to the utility plants. Illinois-produced coal destined for Florida utilities also utilized rail-barge service via the entire length of the Mississippi River to the Gulf and then the Intercoastal Waterway to the plants. The transportation cost advantage of utilizing the inland waterway system for marketing Illinois coal is significant as illustrated by the lack of any direct rail shipments to land-locked utilities in the Southeast.

When shipping coal short distances within the state, trucks and conveyor-to-plant operations are used to supply the coal requirements of a few Illinois utilities. Trucks are used to supply coal to utilities in Springfield, Grand Tower, Oakwood, Hutsonville and Marion. Conveyor systems are currently used to supply utilities at Kincaid, Baldwin and Coffeen.

Western Coal

Currently, the only economical means of transporting coal to Illinois from mines in Montana, Wyoming and Colorado is by unit train. Rail-barge movements only occurred after the coal had been transported into the state by rail.

In 1980, 14.1 million tons of Western coal was shipped to the Illinois plants. Of this total tonnage, railroads delivered 10.7 million tons directly to Illinois plants located in the Peoria area, Joliet and Wood River. Barges were used for the final delivery of 3.5 million tons to the Chicago area via the Illinois River. This coal was transported via unit train to a river terminal at Havana, where it was then then transloaded to barge for delivery to the plants.

Kentucky and Indiana Coal

In 1980, Illinois utilities burned 1.9 million tons of coal from Kentucky and Indiana mines. Seven hundred thousand tons of this traffic was Kentucky coal shipped to Havana and Hennepin via the Ohio, Mississippi and Illinois Rivers. Other significant movements were 700 thousand tons to Joppa via rail-barge and 391 thousand tons to Hutsonville via truck.

OUTLOOK FOR 1990

Coal Traffic

Railroads and rail-barge will continue to carry the majority of coal traffic in 1990. As shown in Table 12, the total coal traffic in Illinois for 1990 is projected to be 75.5 million tons. In comparison to the 1980 traffic level of 75.1 million tons, traffic levels for 1990 are projected to remain at the 1980 level. With the development of the coal barge loading facility at Cora and increased number of contracts with Florida utilities, rail-barge traffic is projected to increase from 24 percent of the 1980 traffic to 26 percent of the projected 1990 traffic. Railroads are projected to carry 58 percent of coal traffic in 1990. The decrease in conveyor-to-plant traffic by 1990 is based on the assumption that the CIPS' Coffeen plant will shift its source of coal and use railroad transportation from the new mine.

For all modes, except conveyor-to-plant, it is anticipated that more coal will be delivered under long-term contract in 1990 than in 1980. This increase is interpreted to reflect a trend of utilities purchasing larger amounts of coal under long-term contract in recent years and not an indication of a large increase in demand or production. The Illinois coal under long-term contract in comparison to the actual or projected total traffic for 1980 and 1990 is shown in Table 13. Assuming a 1990 production level of 62.5 million tons, long-term contracts would represent 88 percent of the coal purchased in 1990; whereas, in 1980, long-term coal contracts represented only 68 percent.¹⁰

¹⁰ The 62.5 million tons production assumes no change in environmental air quality standards.

TABLE 12
PROJECTED 1990 COAL TRAFFIC WITHIN ILLINOIS
(Thousands of Tons)

<u>Carrier</u>	<u>IL Coal to Market</u>	<u>Western Coal to IL</u>	<u>KY/IN Coal to IL</u>	<u>Total Coal</u>	<u>% Total</u>
Railroad	35,200	8,650	0	43,850	58%
Rail-Barge	15,775	3,000	1,000	19,775	26%
Truck	3,125	0	325	3,450	5%
Truck-Barge	1,100	0	0	1,100	1%
Conveyor-Plant	6,000	0	0	6,000	8%
Barge	<u>1,300</u>	<u>0</u>	<u>0</u>	<u>1,300</u>	<u>2%</u>
TOTAL	62,500 ^a	11,650 ^b	1,325 ^c	75,475	100%

Source: Illinois Department of Transportation.

^a Assume recovery of demand to 1980 level.

^b Coal under long-term contract, no increases assumed.

^c 325 thousand tons under long-term contract.

TABLE 13

COMPARISON OF 1980 TO 1990 ILLINOIS COAL TRAFFIC
(Thousands of Tons)

Mode	1980 Traffic			1990 Traffic		
	Long-Term Contracts		Total Traffic	Long-Term Contracts		Projected Traffic
	Tons	% Total		Tons	% Total	
Railroad	21,225	50%	32,072	32,035	56%	35,200
Rail-Barge	10,438	24%	13,942	14,590	25%	15,775
Truck	1,616	4%	3,122	2,355	4%	3,125
Truck-Barge	500	1%	778	985	2%	1,100
Conveyor-Plant	8,015	19%	8,015	6,000	10%	6,000
Conveyor-Barge	967	3%	1,080	1,300	2%	1,300
TOTAL	42,761	100% ^a	59,009 ^b	57,265	100% ^a	62,500 ^c
						100% ^a

^a Percentages do not add due to rounding.

^b Represents 95 percent of the total 62,500 thousand production in 1980.

^c Assumes recovery of demand to 1980 level.

Source: Illinois Department of Transportation survey.

System Requirements

No major changes are anticipated in the coal transportation system in Illinois through 1990. Generally, the railroad routes and ports that were key in 1980 will continue to be important in 1990. In terms of recently constructed facilities, Cora, which began operation in 1980, is anticipated to become a major river terminal by 1990. Although less significant in the overall statewide picture, a trend toward concentration of truck traffic over fewer highways is expected to continue with the 1990 total traffic level at about the same level as 1980.

Based on a general review of the physical transportation facilities, no major system problems were identified. All significant railroad coal routes are currently capable of carrying 100-ton cars, which are typically used in unit trains, and specific line improvements are being addressed by the railroad companies. The inland waterway system currently has excess coal handling capacity, which can accommodate the projected increases in coal traffic through 1990. The highway system required for coal traffic will be evaluated on a route-by-route basis as part of the Illinois Department of Transportation's planning process for developing its Annual Highway Improvement Program.

CHAPTER FOUR

COAL MARKET DEVELOPMENT THROUGH TRANSPORTATION INVESTMENT

Investment in transportation facilities, financed either by private industry or government, influences the access and cost of transporting Illinois coal to domestic and export markets, and Western coal into the Midwest. Currently, the transportation cost for Illinois coal to Midwestern and Southeastern markets is lower than the costs for Western and some Appalachian coals in these markets. To maintain or improve the competitive position of Illinois coal in these markets, improvements in certain transportation facilities are desirable for the Illinois coal mining industry. Recent or planned major investments in transportation facilities and their impact on the marketability of Illinois, Western and Appalachian coals are described in this chapter.

RAILROAD IMPROVEMENTS PROMOTING COAL MARKETABILITY IN THE MIDWEST

Railroad investments in Illinois and the Powder River Basin will affect Illinois coal markets and the choice of coal purchased by Illinois utilities. In Illinois the MP, ICG, and Southern have made investments that promote Illinois coal in Midwest markets. The BN, CNW and UP have made investments improving railroad transportation and therefore the marketability of Western coal in Illinois.

The MP, the largest carrier of Illinois coal, has developed efficient unit train service between mines in Southern Illinois and Mississippi River docks at Kellogg, Ford and recently Cora. This service has been and will continue to be key to the development of Illinois mines and river terminals on the MP system.

The ICG, the second largest carrier of coal in Illinois, has made service improvements that also contribute to the marketability of Illinois coal. Last year the ICG rehabilitated its line from the Crown III mine south of Springfield to Hoosier Power at Merom, Indiana via Mt. Pulaski, Mattoon and Effingham. Of the total \$16.4 million, \$9 million will be repaid to Hoosier Power through lower transportation rates over a ten-year period. The project will allow efficient transportation of 1.3 million tons of coal annually by 1985.¹¹

By the end of 1983, the ICG plans to upgrade the 10.7 mile line between the Kerr-McGee mine at Galatia to Ferber on the mainline. The \$4 million rehabilitation project will begin this year and continue for about two years. This project will allow the movement of one million tons of coal to Union Electric in Missouri.

¹¹ The main line section of this movement was not improved as part of this project.

Southern Railway's purchase of Conrail's Cairo Branch between Keensburg and Cairo in Southern Illinois provides for continued railroad service to the Sahara mine in Harrisburg as well as to Joppa Electric. The total cost of the line was \$4.3 million. Due to the current and potential coal movement, the Southern has rehabilitated portions of the line from the Sahara mine to Harrisburg and from Stonefort to Keensburg. Since Southern moves Sahara coal to Joppa Electric under a long-term contract, the Stonefort to Karnak portion may potentially require upgrading.

The Burlington Northern (BN) has invested in railroad facilities for coal traffic in Illinois and in the West. In the late seventies, BN upgraded a line from the Crown II mine at Girard to CILCO's Duck Creek plant at Dunfirmline at a total cost of over \$2 million to accommodate Illinois coal. In the West, the Burlington Northern's access to the Powder River Basin provides Western coal an advantage in Midwestern markets by making unit train rail service available. Since 1975, the BN has invested \$1 billion in improvements in rail lines into the Powder River Basin area. The anticipated volume of coal traffic from the Powder River Basin coal fields is 80 million tons by 1990, of which only about 6 million tons will be destined for Illinois.¹²

RIVER TERMINAL DEVELOPMENT

Due to the cost advantage of barge transportation, the availability of river terminals for coal shipment is key to the development of coal markets for Illinois mines. Through use of the inland waterways, these mines are capable of competitively marketing their coal to utilities in Georgia and Florida, as well as to cement industries overseas via New Orleans. While several key coal transfer facilities have opened in recent years, the current development of river terminals for coal shipments has slowed. Reduced development has resulted from the depressed price of coal brought on by the worldwide coal glut, extremely high interest rates, and the risk associated with potential changes in environmental legislation. The factor of risk is significant when considering that if Illinois coal could not be competitively marketed as a result of Congressional action leading to stricter environmental standards, the total investment required to construct a coal transloading terminal could be lost.

Coal terminals within Illinois are currently capable of handling over 80 million tons of coal annually.¹³ Major established coal-loading terminals that are key to marketing Illinois coal include the Kellogg

¹² The CNW and BN are involved in an ownership dispute over the new line the BN constructed into the Powder River Basin. In October 1982, the ICC ruled that the CNW could share ownership of part of the line if it paid its share of the construction costs. The BN has filed a challenge to the ICC ruling in the U. S. District Court of Appeals.

¹³ See Table 46, page 122, for a list of major ports with their operational capacity, storage capacity, landside transportation and 1980 tonnage.

Coal Transfer Terminal at Kellogg, Arch Mineral's coal terminal at Chester, the ICG/BN terminal at East St. Louis and Peabody Coal Company's terminal at Shawneetown.

Within the last five to seven years, several new coal-loading river terminals have opened. These facilities have ranged in size from very small, truck-only operations, to very large, high-volume operations handling unit train shipments in a matter of hours. The most noted of these larger coal-loading facilities is the Cora Coal Transfer Terminal on the Mississippi River. Served by the MP, the Cora facility utilizes a loop track, train indexer and rotary dumper to unload 110-car unit trains at a rate of 3,500 tons per hour. The unloaded coal can either be loaded directly into barges or deposited in the terminal's storage yard, which has a capacity of 100,000 tons. With its 5,700 tons per hour barge loading capacity, the Cora terminal is capable of effectively handling 15 million tons of coal annually, making this facility the largest of its type on the inland waterway system.

The Kaskaskia Regional Port District opened as a coal-loading facility in 1976. This facility is served by a railroad operated by the Peabody Coal Company. The port handles coal from two nearby Peabody Coal preparation plants, which process coal from five mines in the area. In 1981, the terminal handled 2.8 million tons of coal. This tonnage is projected by Peabody Coal Company to increase to 4.0 million tons in 1982. Although it has no storage capacity, the throughput capacity of this facility is 10 million tons annually.

The most recent capital investments in coal river terminals have been made at Shetlerville and Quincy. In early 1982, Barter Enterprise opened its coal-loading facility at Shetlerville. This facility receives coal by truck and is capable of loading barges at a rate of 3,000 tons of coal per hour. The new facility is also capable of blending coals, which can be important in marketing Illinois coal. At present, Barter Enterprise receives coal from Amax Coal's Delta Mine. Prince Manufacturing in Quincy also began receiving coal via truck in 1982. This facility is currently used to annually transload approximately 500 thousand tons of coal received by truck from Freeman United's mine at Industry. This coal is destined for Muscatine Power and Water via barge.

Despite uncertainty of federal environmental regulations, as well as the existing high loading capacity in Illinois, interest has surfaced in proposed new facilities at Cairo, Shawneetown, and Warsaw. Considering current economic conditions and the high degree of risk involved, these development plans are tentative for the near-term future.

NEW ORLEANS AREA PORT DEVELOPMENT

Illinois coal is exported to overseas markets via coal loading docks along the Mississippi River near New Orleans. The New Orleans routing to European markets is more attractive than a Great Lakes routing via Chicago due to the transportation cost savings associated with barge service on the Mississippi River and the competitive bids for ocean

freight available at New Orleans, which is a heavy volume port for ocean shipping through the Gulf. Using barge-competitive rail rates and approximations of current ocean freight rates to Rotterdam, a New Orleans routing from a Southern Illinois coal mine has a \$2.25-4.75 price per ton advantage over a Great Lakes routing through Chicago and Quebec City.¹⁴

Currently, four coal loading facilities are in operation in the New Orleans area. Development of new port facilities has been slowed by the present coal glut as well as the poor state of the world's economy. Construction of new coal loading facilities continues only on the East Coast. In New Orleans, the eight planned new facilities have been delayed, and a proposed deepening of the channel from 41 feet to 50-55 feet to increase the utilization of the port by larger ocean vessels is now receiving heavy public criticism, particularly if user fees are imposed to pay for the improvement. Assessment of user fees would eliminate the ocean freight advantage gained by using larger vessels.

The Ryan-Walsh Stevedores Terminal at Myrtle Grove, which is served by MP and ICG, has been used for export of Illinois coal. Export shipments in 1981 were 640 thousand tons and 1982 shipments are expected to be about one million tons. Illinois coal reached this terminal either via the main line ICG service to the port or via MP to the Illinois Mississippi River docks in Illinois, then via barge down the Mississippi River.¹⁵

DEVELOPMENT OF CHICAGO PORT FACILITIES¹⁶

The coal handling facilities in the Chicago area, having a capacity of 9-10 million tons annually, are currently underutilized. Due to economic circumstances outside the region, outbound coal shipments have declined. Between 1977 and 1980, total coal shipments from Chicago to other Great Lakes ports have fallen from 3.1 million tons to 1.9 million tons. In 1981, only 1.7 million tons of coal were shipped from Chicago. This tonnage represented only 21 percent of the coal loading capacity available.¹⁷

¹⁴ Based on rates quoted by transportation carriers and facilities.

¹⁵ An alternative Gulf port which has export potential for Illinois coal is Galveston. Main line rail service is available from Illinois mines via MP.

¹⁶ This section refers to all maritime operations within the Chicago area.

¹⁷ This discussion pertains strictly to coal. Coke, a coal or petroleum by-product, is moved through Chicago to both foreign and domestic markets, primarily via the Great Lakes. Rail to Water Transfer Corporation operates the largest coke transshipping facility in the Midwest. In 1980, the total shipment of coke from this facility was 900,000 tons; in 1981, it was 850,000 tons. The coke shipped through the facility is primarily produced by steel and petroleum companies in Northeast Illinois and Northwest Indiana. The primary market for this coke is Western Europe. Other markets include South America, Canada and states along the Great Lakes. According to the U. S. Bureau of Mines, Illinois coal used for coking purposes is mined at sites in Jefferson, Franklin and Saline Counties only.

Ports on Lake Erie have been more successful than Chicago in the Canadian and export markets due to lower lake freight rates. In addition, the Lake Erie ports have cut into Chicago's domestic coal market, delivering low sulphur Eastern coal to utilities in Wisconsin and Michigan. In 1980 and 1981, export coal traffic was new to Lake Erie ports. Previously, this coal moved through U. S. ports on the East Coast. However, the Great Lakes routing through Quebec City became a competitive alternative due to the high ocean freight rates and the additional demurrage charges due to port congestion on the East Coast. With direct rail service to the Lake Erie ports, and the shorter ocean shipping time from Quebec City to Europe, coal shippers rerouted coal originating in West Virginia, Kentucky, Ohio and Western Pennsylvania through the Great Lakes. Since that time, shipping conditions have changed at U. S. ports. Ocean freight costs have dropped sharply and the congestion problems that added high demurrage charges at East Coast ports have been solved. Subsequently, export coal traffic through the Great Lakes declined from 1.6 million in 1981 to 1.1 million in 1982.

For the future, export coal traffic through the Great Lakes is anticipated to remain around 1-2 million tons/year, depending on overall demand for U. S. coal on the world market. Even though this traffic is low compared to approximately 48 million tons annually shipped out of Norfolk, it is nevertheless important to Great Lakes ports.

The primary reason for the low volume of coal traffic moving through the Great Lakes is the inability of the ports to offer competitive rates to Europe, due to lock size limitations on the St. Lawrence Seaway. The locks do not allow larger ocean vessels to enter the Great Lakes. Without these larger vessels, coal must be transloaded at Canadian ports, primarily Quebec City. The additional transloading fee makes Great Lakes rates less competitive than most rates offered at deep-draft ports on the East and Gulf Coasts.

Within the Great Lakes, the Port of Chicago is poorly positioned to compete with Lake Erie ports. As shown in Table 14, Great Lakes ports exported 1.6 million tons of coal in 1981. All of this coal originated from mines primarily in the Appalachian region. The additional lake freight cost to reach Chicago places Illinois coal at a competitive disadvantage in relation to Appalachian coal. If coal were shipped from Chicago to Quebec City, the additional lake freight cost would add approximately \$3.00-3.50 per ton to the price of Illinois coal over the price of similar quality coal shipped from Ohio mines via Conneaut, Ohio.

TABLE 14

GREAT LAKES PORT COAL LOADING CAPACITIES AND 1981 SHIPMENTS
(Millions of Net Tons)

<u>Lake Erie Ports</u>	<u>Effective Capacity</u>	<u>Actual Shipments</u>			<u>Excess Available</u>	<u>% Capacity Utilized</u>
		<u>U. S.</u>	<u>Canada</u>	<u>Export</u>	<u>Total</u>	
Ashtabula	7.0	.90	4.0	.02	4.92	70%
Conneaut	13.5	1.40	6.3	.85	8.55	63%
Erie	.5	.04	.0	.07	.11	22%
Sandusky	7.5	2.50	3.0	.05	5.55	74%
Toledo	20.0	8.50	3.2	.63	12.33	62%
TOTAL	48.5	13.34	16.5	1.62	31.46	65%
<u>Other Great Lakes Ports</u>						
Chicago Superior	10.0	1.70	.0	.00	1.70	17%
	14.0	4.20	.0	.00	4.20	30%
TOTAL	24.0	5.90	.0	.00	5.90	47%

Sources: U. S. Maritime Administration, Great Lakes Region, "Great Lakes Export Coal Trade Summary of 1981," March 1982. Interviews with representatives of Rail to Water Transfer Corp., Chicago, Illinois.

HIGHWAY IMPROVEMENTS FOR COAL TRAFFIC

Good highways within Illinois are needed for efficient truck transportation of coal, primarily over short distances between Illinois mines and utilities. The maintenance and improvement to accommodate coal traffic is funded through both public and private sources, depending on the highway jurisdiction and the annual volume of coal traffic.

The Illinois Department of Transportation has the responsibility for maintaining Illinois and Interstate highways within the State. The Department uses information on coal traffic in programming annual highway maintenance and improvements.¹⁸

On the county level, private investment is sometimes needed to supplement county highway programs. For new mines, county highways to the mines sometimes need upgrading to handle the heavy loads. Two county highways are currently being upgraded by mining companies.

The Turris Mining Company is reconstructing three miles of the county highway from their new Elkhart mine to I-55 frontage road. The total cost for the road, loading dock and weigh station is \$3 million. Initial coal shipments to Springfield's City Water, Light and Power began in November 1982. After 1983, the contract calls for one million tons/year for 20 years.

The Freeman United Mining Company is upgrading 1-1/2 miles and building 1-1/2 miles of county highways to their new mine at Industry. The 15-year contract calls for the movement of 500,000 tons per year to Muscatine Power in Iowa beginning in 1983. Initial shipments began in September 1982, but not at the 500,000 tons per year level.

Private funds are also used for maintenance of county highways primarily used for coal traffic. The Black Beauty Mining Company pays 65¢/ton for maintenance of six miles of county highway into the Newton power plant. The three year contract calls for 400,000 tons of coal from the Apraw mine in Indiana.

COAL SLURRY PIPELINES

Coal slurry pipelines offer a new mode for transporting coal within the United States. Pipeline supporters claim that pipelines could be an economically viable alternative to both railroad and barge transportation. They claim that in the long-run, pipelines would be more resistant to inflation, since over half of their costs would be fixed and therefore less affected by operational cost fluctuations.

¹⁸ For specific information on highway conditions and traffic for State and Interstate coal routes, see Table 52 in Appendix D.

Proposed coal slurry pipelines have raised several issues. In 1982, two bills were introduced before Congress that would give the federal government the authority to grant eminent domain for the construction of interstate coal slurry pipelines. Since direct competition with railroads would result, any Congressional decision to promote pipelines through this legislation should be weighed against existing policy in the 1980 Staggers Act, which deregulated rail rates as a means to improve the economic health of the railroad industry.¹⁹ Similar eminent domain legislation has been introduced in 1983.

The major area of competition between pipelines and railroads would be for new mine-utility contracts, which generally run 20-30 years. Pipeline companies would have to secure enough long-term contracts prior to construction in order to make the project economically worthwhile. Once long-term contracts were signed, competition would occur only as contracts were terminated or were renegotiated or as new plants came on-line. The question of whether railroads, rail-barge or pipelines could offer the best rates is very speculative. Since the only operational pipeline in the U. S., the 270-mile Black Mesa pipeline in Arizona, has no railroad competition, actual freight rate comparisons are impossible.

Nine companies have plans for constructing pipelines in the next decade. The general corridors are shown on Figure 1. Two pipelines could possibly affect Illinois: the Coalstream pipeline between Illinois and Florida, also serving the West Virginia and Kentucky coal fields; and the Energy Transportation Systems, Inc. (ETSI) pipeline between Wyoming and Arkansas.

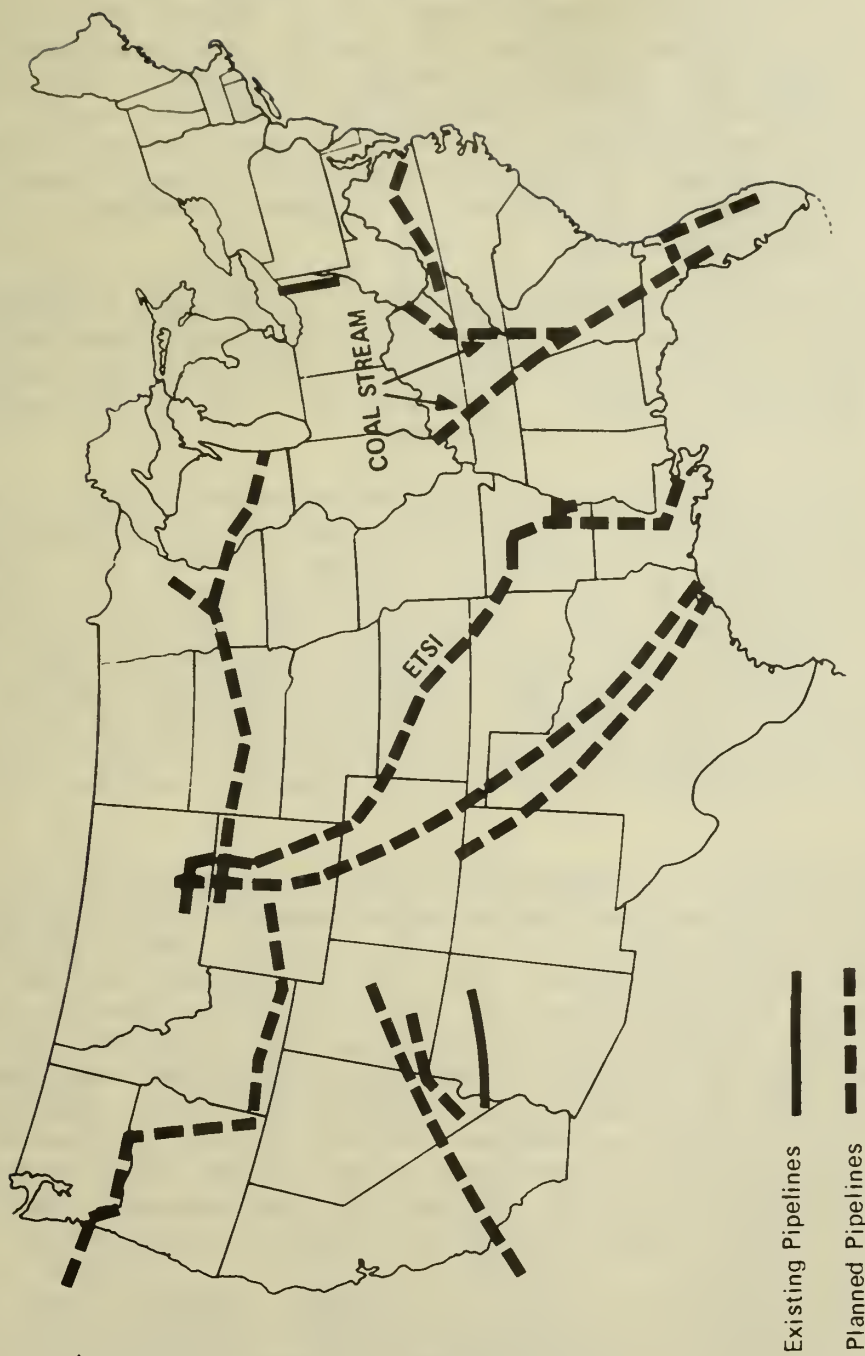
The Coalstream pipeline, if constructed into Illinois, is not expected to increase the demand for Illinois coal, but rather to erode Illinois coal's competitive position in Georgia and Florida by decreasing the transportation costs for Appalachian coal. Also, existing railroad and barge facilities are adequate for accommodating projected increases in traffic through the 1990s. The ETSI pipeline is not expected to have any significant impact on Illinois coal markets. The ETSI pipeline will primarily serve utilities in Arkansas, Oklahoma and Louisiana, which would not use high sulphur Illinois coal.

Eminent domain legislation would not be in the best interest of the State of Illinois. None of the proposed pipelines would benefit Illinois coal and the Coalstream pipeline could erode Illinois coal's position in the Southeastern utility market.

Coalstream Pipeline

The Coalstream Pipeline Company has plans to construct a \$3 billion coal slurry pipeline to deliver 50 million tons of coal annually from coal

¹⁹ The Association of American Railroads estimates that the loss in revenues nationally as a result of pipeline operations would be \$700 million/year; and that construction of all of the pipelines would result in a direct loss of 41,000 permanent railroad jobs, while creating less than 7,000 permanent pipeline jobs.



Source: National Coal Association, Facts About Coal, 1982

Figure 1
COAL SLURRY PIPELINES

producing areas in Appalachia and the Illinois Basin to electric generating plants in Georgia and Florida. The major obstacle to the construction of the Coalstream pipeline has been the acquisition of right-of-way. Since most Eastern railroads own the sub-surface easement rights under their property, Coalstream has not been able to obtain the majority of its proposed right-of-way. As a result, Coalstream has no specific routing for the pipeline. If federal legislation were enacted, Coalstream would then have to determine the specific termini for the mine-utility movements prior to designating a specific route. Since the responsibility for transportation for most mine-utility contracts now lies with the utilities, the future of the pipeline would depend in large part on the ability of Coalstream to organize commitment by Southern utilities to use the pipeline.

The impacts of the Coalstream pipeline on Illinois are very speculative at this stage of planning. Although the pipeline plans call for an extension into Illinois, the contracts that Coalstream secures will determine the actual routing. It is possible that if the pipeline were built, it would not extend into Illinois.

From an Illinois perspective, the Coalstream project would not offer any benefits to Illinois coal's position in the Florida and Georgia market, but would likely hurt its position. As shown on Table 15, Illinois coal provided 59 percent of the high-sulphur coal burned by Florida and Georgia utilities in 1980. If all existing utility contracts are fulfilled, Illinois coal would maintain 58 percent of the 1990 high-sulphur coal market and realize an increase of 2.3 million tons in annual shipments to the Southeast. The key questions for Illinois are: What share of the Southeast market can Illinois coal expect to gain with the current transportation, and could a pipeline increase that market share?

The inexpensive barge transportation and close proximity of Illinois mines to the inland waterway system has allowed Illinois coal to compete with closer Eastern mines. All of the utility plants in Georgia and Florida which burn high-sulphur coal can be reached via the currently used rail-barge transportation. The coal traffic destined for Florida is transported from Southern Illinois mines by rail to the Mississippi River then by barge to the plants via the Mississippi River and Intercoastal Waterway. Inland plants can be reached by an additional rail movement to the plant once the coal has reached Florida. All of the Georgia traffic is transported by rail to terminals either on the Mississippi or Ohio Rivers, then by barge to Pride, Alabama via the Tennessee River where it is picked up by the Southern Railway for delivery to the plants.

The Coalstream pipeline, as it is planned, would serve mines in Kentucky, West Virginia, Virginia, Ohio, and Pennsylvania, as well as Illinois. Competition from coal produced in these other states might hurt Illinois coal's advantage gained through low prices at the mines and cheap water transportation. Generally, coal from Illinois, Western Kentucky and Indiana is cheaper at the mines than Appalachian coal. This advantage is enhanced by relatively low-cost barge rates, but is offset by the higher scrubbing costs for the higher sulphur content. The average prices for coals produced in various states potentially served by the pipeline are shown in Table 16. Even if the pipeline offered the

TABLE 15

PROJECTED COAL REQUIREMENTS FOR FLORIDA AND GEORGIA UTILITIES
(Millions of Tons)

State/Type of Coal ^b	1980			1990		
	Total Tons	IL Contracts ^b	% Total	Total Tons	IL Contracts ^b	% Total
Florida Utilities						
Low Sulphur	5.1	0	0	12.2	0	0
High Sulphur	3.6	2.0	56%	9.9	5.3	54%
Unknown ^c	0	0	0	0-8.3	0	0
TOTAL	8.7	2.0	23%	22.1-30.4	5.3	17-24%
Georgia Utilities						
Low Sulphur	12.7	0	0	12.7-18.3	0	0
High Sulphur	8.0	5.0	63%	8.0	5.0	63%
TOTAL	20.6	5.0	24%	20.6-26.2	5.0	19-24%
Florida and Georgia						
Low Sulphur	17.8	0	0	24.9-30.5	0	0
High Sulphur	11.6	6.9	59%	17.9	10.3	58%
Unknown ^d	0	0	0	0-8.3	0	0
TOTAL	29.4	6.9	23%	42.8-56.7	10.3	18-24%

^a The high projection was based on published information. The low projection takes into consideration conversations with utilities indicating that some plants originally planned for the 1980s probably will not be operational until the 1990s or later. Low sulphur coal is defined as coal with 1.0 percent sulphur content or less. High sulphur coal is defined as coal with 1.0 percent sulphur or more.

^b Based on Illinois coal delivered to utility plants in 1980 or under contract for delivery in 1990.

^c The type of coal that is projected to be used in new plants was not specified. The decision on the type of equipment and therefore the type of coal that will be used will be influenced by environmental legislation.

Source: 1981 Keystone Coal Industry Manual; The Florida Electric Power Coordinating Group, Inc., 1982 Ten-Year Plan, State of Florida; and Illinois Department of Transportation survey of utilities.

TABLE 16
AVERAGE COAL PRICE PER TON AT MINES BY STATE

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
Midwest					
ILLINOIS					
Deep	7.52	11.12	16.30	17.76	18.34
Surface	5.81	8.70	12.72	13.78	15.99
Indiana					
Deep	6.94	--	12.00	--	--
Surface	6.04	8.36	11.14	12.26	13.79
Kentucky (Western)					
Deep	6.49	10.25	13.73	15.12	16.33
Surface	5.53	7.86	10.91	13.41	13.20
<u>North Appalachia</u>					
Pennsylvania					
Deep	12.02	22.63	30.41	32.73	33.79
Surface	7.67	17.83	19.08	17.63	13.80
Ohio					
Deep	8.50	13.70	18.75	17.78	21.59
Surface	6.30	11.63	15.23	15.96	16.06
West Virginia					
Deep	12.24	21.75	30.60	31.64	33.25
Surface	8.59	21.21	24.04	23.86	23.58
<u>South Appalachia</u>					
Alabama					
Deep	15.64	30.30	33.77	35.73	36.88
Surface	8.03	17.84	22.37	24.52	25.35
Kentucky (Eastern)					
Deep	10.63	24.72	27.03	26.37	28.40
Surface	7.05	15.01	15.35	20.36	19.28
Virginia					
Deep	12.70	25.87	34.44	26.73	34.36
Surface	7.62	23.11	22.98	19.24	22.18

Source: Illinois Economic and Fiscal Commission, Illinois Coal: the Status, Regulation and Outlook of a Major Industry, January 1982, p. 12.

same per mile rate to Illinois and Kentucky coals, which are similar in quality and both low in price compared to some Eastern coals, Kentucky coal's delivered price would be lower, due to the shorter distance. The pipeline could be especially detrimental to Illinois coal's position in the Southeast if it did not extend into Illinois. Currently, Illinois coal delivered to Florida utilities via rail-barge has a \$7 per ton delivered price advantage over Eastern Kentucky coal of similar quality delivered by railroad.²⁰ Pipeline rates would have to be low enough to eliminate this advantage to make purchase of Eastern Kentucky coal more economical. However, since no similar pipelines exist, comparative freight rates cannot be estimated.

Transportation costs affect coal marketability, but for Illinois coal, its quality will be the major factor determining the magnitude of future purchases. Currently, Florida's State Environmental Protection Agency is reviewing the environmental impacts of burning Illinois' high sulphur coal. The outcome of this review could influence the potential for Illinois coal producers to sell their coal to Florida utilities in the future.

ETSI Pipeline

Energy Transportation Systems, Inc. (ETSI) plans to build a pipeline from Gillette, Wyoming to Cypress Bend, Arkansas on the Mississippi River. ETSI is proposing to serve the growing demand for coal in the South by constructing a \$4 billion pipeline with an annual capacity of 30 million tons. The ETSI pipeline would directly compete with Western railroads currently serving Oklahoma, Arkansas and Louisiana, but would have little impact on the Illinois coal industry, since Illinois coal would not be competitive in these market states.

Currently, most of the utilities in Oklahoma and Arkansas burn oil or gas. In 1979, coal accounted for approximately 29 percent of Oklahoma's and none of Arkansas' or Louisiana's utility generated electricity. However, all new utility plants and plant expansions in these states are planned as coal-fired units designed to burn low sulphur coal. If all of these plants are constructed, they will require 53.1 million tons--more than the pipeline could supply.

Acquisition of right-of-way is not viewed as a major problem by ETSI, which has already purchased approximately 90 percent of the right-of-way. Over the past few years, ETSI has gone to court in over sixty cases at a cost of over \$20 million to establish that railroads do not own the sub-surface easement rights under their tracks and therefore cannot deny right-of-way for the pipeline. The environmental impact statement for the pipeline was approved in 1981 and the final portions of right-of-way are under negotiation.

²⁰ Subhash Bhagwat, Illinois State Geological Survey.

The major obstacle currently facing ETSI is the acquisition of water rights. Recently ETSI signed an agreement with the State of South Dakota to purchase water from the Missouri River. Several surrounding states are appealing South Dakota's authority to sell the water. However, ETSI plans to proceed with construction next year unless prohibited by court injunction. The pipeline is scheduled to be operational in 1985.

INLAND WATERWAY USER FEE LEGISLATION

Two issues associated with the proposed waterway user fee to pay for operations and maintenance costs are full cost recovery versus partial cost recovery and segment-specific charges versus a systemwide fee. The key cost recovery question is what portion of the costs should be paid for through user fees--the total cost or only a portion of the cost? Concerning assignment of costs to the Inland Waterway system for the purpose of calculating user fees, there are two general approaches: (1) a segment-specific approach, whereby the costs for operating, maintaining and improving each segment would be paid for by the users of that segment, or (2) a systemwide approach, whereby all of the costs for the whole system would be aggregated and then evenly distributed over the entire system.

The Reagan Administration supports full cost recovery and assignment of operation and maintenance costs on a systemwide ton-mile basis. This position is based on a policy advocating maintenance of existing traffic patterns. The states along the inland waterway generally support only partial recovery, if they support any fees at all. State positions on the type of approach varies, depending on each state's geographic location and type and volume of commodities shipped.

In Illinois, the potential impacts on coal terminals of implementing either a segment or a systemwide fee vary according to their location on the Inland Waterway System and the destination of the coal shipments. Generally, low-volume high-cost river segments, such as the Mississippi River above St. Louis and the Kaskaskia River, would incur higher costs under a segment-specific fee than under a systemwide fee. The opposite would be true for high-volume low-cost river segments, such as the Mississippi River below St. Louis and the Ohio River. High-volume high-cost river segments, such as the Illinois River, would incur nearly the same user charge under either tax alternative. Looking at coal movement from Southern Illinois ports, for northbound coal shipments a systemwide user fee would result in lower costs, whereas for southbound coal shipments a segment-specific fee would result in lower costs.

For Illinois coal traffic, major diversions from Illinois suppliers are unlikely under either a systemwide or segment-specific user fee. Illinois coal currently has a delivered price advantage large enough to offset a user fee in most Midwestern and Southeastern states. In six of the seven states which receive Illinois coal by barge, utilities may pass transportation cost increases in ongoing contracts on to consumers through state fuel adjustment clauses. For Missouri, which does not have a fuel adjustment clause, a major loss in coal shipments from Illinois is not expected due to the close proximity to Illinois suppliers and the wide range of transportation alternatives available. In addition, water-competitive rail rates may also rise in response to increases in barge rates resulting from a user fee. Increases in rail rates would minimize traffic diversions from the waterways.

THE COST OF TRANSPORTATION AS PART OF THE UTILITY FUEL ADJUSTMENT CLAUSE

In recent years, regulatory commissions in many states have been reviewing procedures governing how utilities are allowed to adjust their costs and rates to consumers. Traditionally, state regulatory commissions have used a fuel adjustment clause, which is a legal mechanism that allows utilities to pass along increases or decreases in certain costs to the public without requesting a rate increase from the regulatory commission. In many states, including Illinois, transportation costs are eligible for inclusion under the fuel adjustment clause. At least fifteen states no longer have fuel adjustment clauses, and two others do not include transportation cost as eligible under their clauses.²¹

In Illinois, proposals to exclude transportation costs from the fuel adjustment clause have been raised before the Illinois Commerce Commission and General Assembly. In November 1981, the Illinois Commerce Commission ruled that transportation costs should continue to be included as eligible costs under the fuel adjustment clause. This position reflected a relatively strict interpretation of the intent and application of the clause and a reliance on the prudent management of utilities in their fuel purchases. The Commission discounted the impact of the fuel adjustment clause on the purchase of Illinois coal, asserting that no bias was caused by the clause.

In response to the Illinois Commerce Commission's ruling, supporters of excluding transportation costs from the fuel adjustment clause are now working to gain State legislative support to overturn the ruling. Among advocates of Illinois coal, concern has arisen that the inclusion of transportation cost in this clause causes utilities to purchase Western coal and not to install scrubber systems, which would allow the use of Illinois coal. In comparison to Illinois coal, Western coal is less expensive at the mine but has higher transportation costs, which have been increasing in recent years. Currently, under the fuel adjustment clause, increased transportation costs can be passed on to the consumer. On the other hand, before a utility can install a scrubber system and recoup its cost through its rates, the Illinois Commerce Commission must approve a rate increase. A utility can begin recouping the cost of the scrubber only when construction has been completed, while a utility purchasing low sulphur Western coal can recoup its investment almost immediately.

Proponents of continuing to include transportation costs in the fuel adjustment clause cite the volatility of fuel costs and cash flow problems for the utilities as reasons not to change the present system. Supporters of a change note a federal report that states that "because increased costs are automatically passed through under an automatic adjustment clause, a utility in theory has a reduced incentive to search for the lowest price available for a clause-covered input and may pay

²¹ Illinois Energy Resource Commission, An Analysis of Coal and Flue Gas Desulfurization System Costs, Springfield, Illinois, April 1982, pp. 3-6.

more for that input.²² The discussion of the fuel adjustment clause may become a significant issue in the near-term future.

SUMMARY

Transportation improvements affect market distribution either by improving or creating access to markets or by decreasing the transportation component of the delivered price of coal. Although environmental regulations will be the major determinant of future coal markets, transportation will continue to exert an influence.

River port development along the Mississippi River, particularly at Cora, and the railroad lines, particularly the MP and the ICG lines, feeding the ports have improved access for Illinois coal to Midwestern and Southeastern destinations. Railroad investment in the Powder River Basin has created better access for Western coal to Midwestern users. Investments in Chicago-New Orleans and Chicago-Galveston main lines have improved transportation for Illinois coal for exports.

The Port of Chicago does not appear to need additional coal loading facilities. Excess loading capacity already exists for coal shippers, and current ocean, barge, and rail rates favor the use of other ports for export shipments of coal.

Construction of the Coalstream slurry pipeline to Florida depends on federal eminent domain legislation. No right-of-way has been purchased and an environmental impact statement has not been developed. However, whether the pipeline extends into Illinois or not, no major market expansions in the Southeast would be expected for Illinois coal as a result of the pipeline. Also, the possibility exists that a pipeline could undercut Illinois coal's current transportation cost advantage, particularly if it did not extend into Illinois.

The implementation of waterway user fees may impact Illinois coal's cost advantage in the Midwest and Southeast. However, no major market losses are anticipated for the following reasons: Illinois coal currently maintains a delivered price advantage sufficient to offset a user fee, fuel adjustment clauses in most states receiving Illinois coal by barge allow transportation cost fluctuations in existing contracts to be passed on to consumers, and water-competitive rail rates may also increase in response to increases in barge rates.

In the near-term future, the issue of whether transportation costs should be eliminated from Illinois' fuel adjustment clause may become important. Last year the Illinois Commerce Commission ruled that transportation costs would continue to be eligible under Illinois' fuel adjustment clause, noting the need for this mechanism due to the wide variation in month-to-month transportation costs for fuel. Opponents of this position believe that the fuel adjustment clause creates a bias against the purchase of Illinois' high sulphur coal and are working for state legislation that would overrule the Commerce Commission's ruling.

²² Department of Energy, Federal Energy Regulatory Commission, Automatic Adjustment Clauses in Public Utility Rate Schedules, February 1982, pp. 22-23.

APPENDIX A: ILLINOIS RESOURCES AND PRODUCTION

OVERVIEW

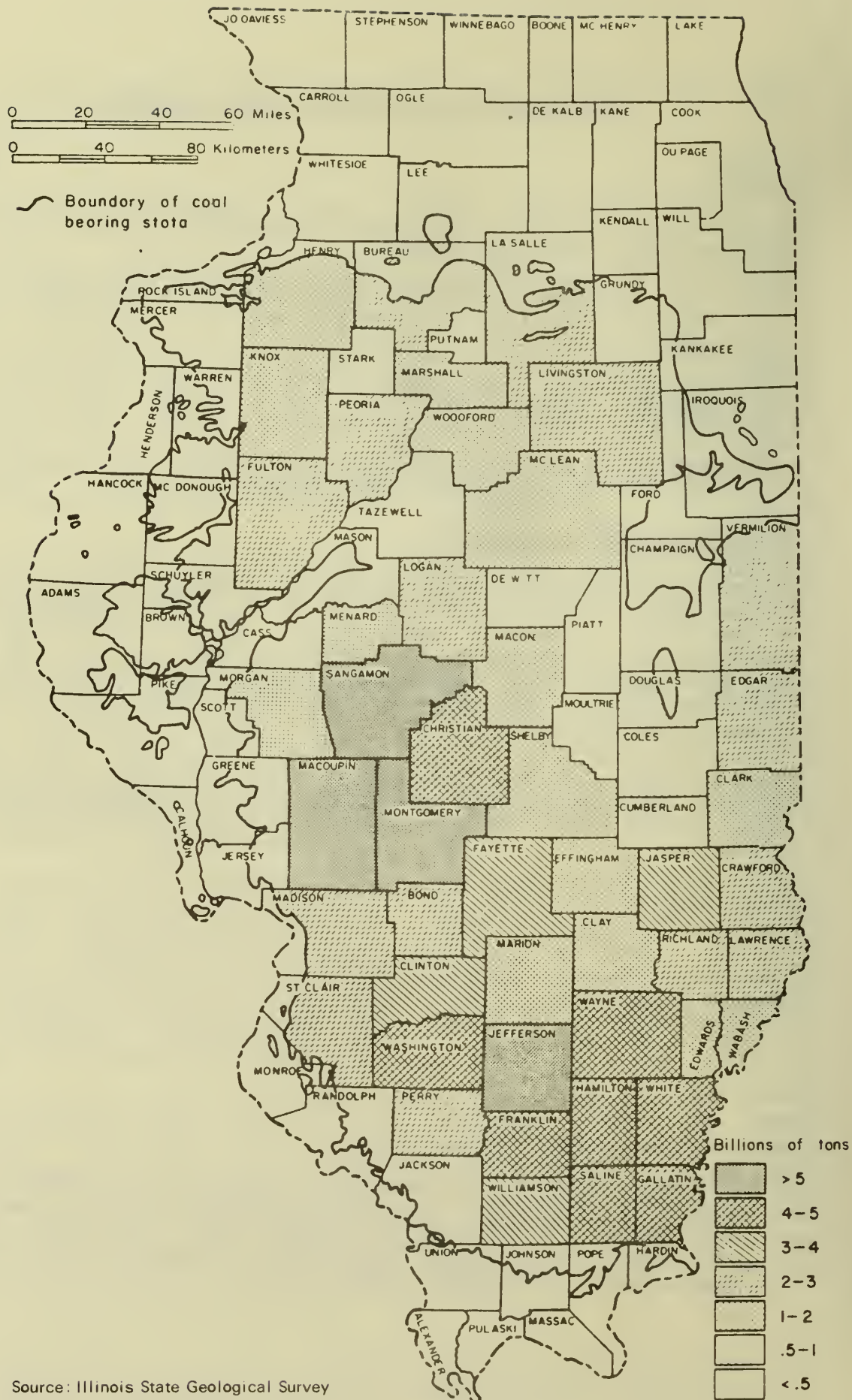
- o Illinois has the second largest reserve base in the United States with 68 billion tons of coal.
- o Coal production in Illinois has historically fluctuated with the national economy but more recently has been affected by clean air regulations.
- o Illinois coal is typically high sulphur and high BTU (10,000-13,000/lb.).²³
- o About 99.8 percent of Illinois coal reserve base contains coal with more than 1 percent sulphur content.

ILLINOIS RESOURCES AND RESERVES

Illinois has extensive coal resources. As shown on Figure 2, the 162 billion tons of resources underlie most of the central and southern part of the state. In terms of coal reserves, which is coal that can be recovered using current mining technology, Illinois has nearly 68 billion tons of bituminous coal, representing 15.5 percent of the total U. S. coal reserve base. In comparison to other states, Illinois has the largest bituminous coal reserves.

The quality of Illinois' reserves is high in sulphur. As shown on Figure 3, approximately 87.5 percent of Illinois' reserves contain more than 3 percent sulphur while 0.2 percent contains less than 1.0 percent sulphur coal.

²³ For the purposes of this study, low sulphur coal is defined as coal with a 1.0 percent or less sulphur content. High sulphur coal is coal having a sulphur content greater than 1.0 percent. Western coal often has a sulphur content of 0.6 percent. Illinois coal typically has 2-5 percent sulphur.

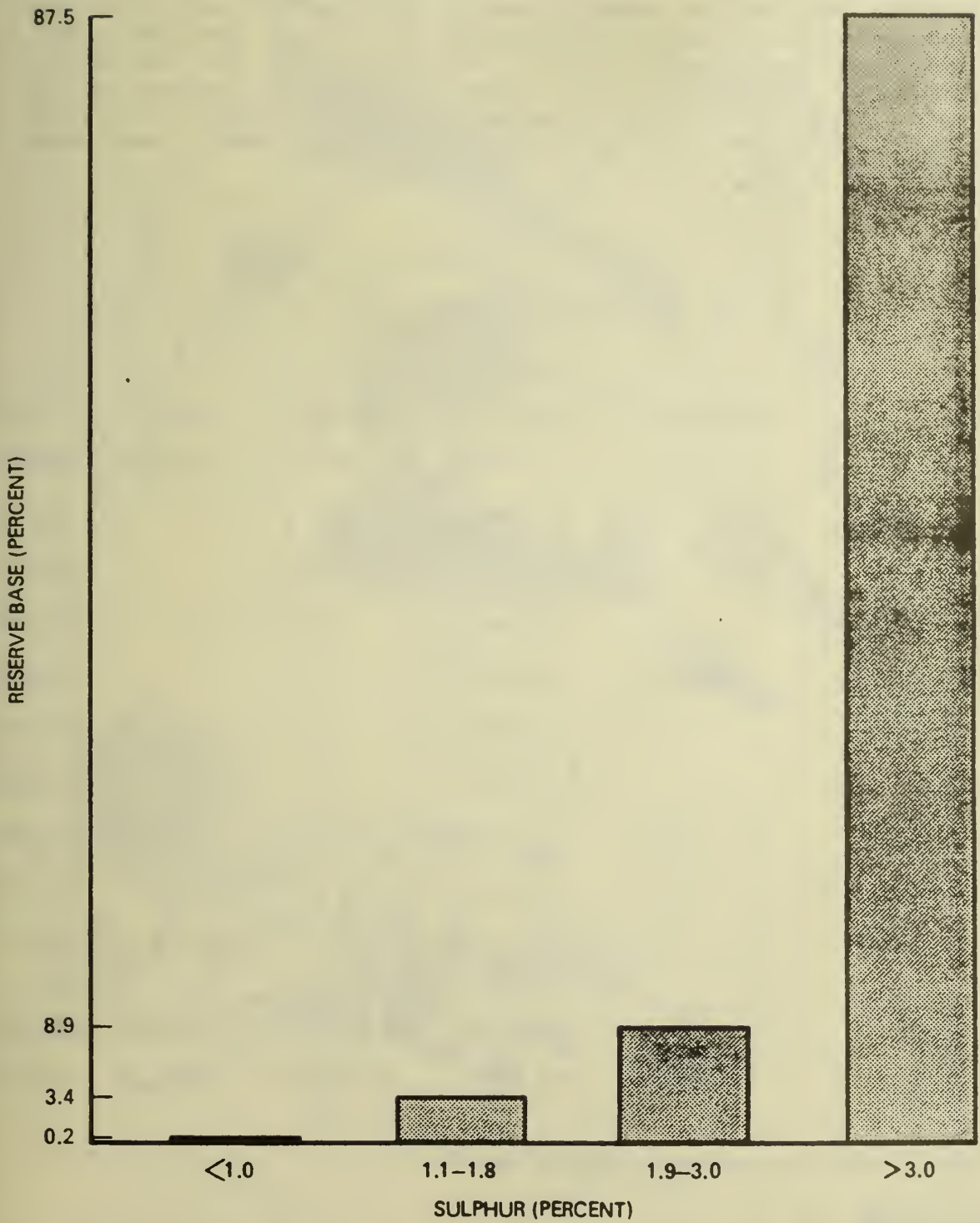


Source: Illinois State Geological Survey

Figure 2
ILLINOIS COAL RESOURCES

Figure 3

ILLINOIS COAL RESERVES BY SULPHUR CONTENT



Source: Illinois State Geological Survey estimate by Coal Section.

NATIONAL COAL RESERVES

While Illinois has the largest bituminous coal reserves in the nation, Montana has the largest reserve base of all coals. Anthracite and bituminous coals are harder and higher in BTU content than the softer sub-bituminous and lignite coals. Sulphur content of anthracite, sub-bituminous and lignite coals is generally between 0.2 percent to 1.5 percent. Sulphur content of bituminous coal varies widely from 0.5 percent to 5.0 percent. The top 10 states with the highest reserve base are presented in Table 17.

TABLE 17
COAL RESERVES BY STATE
(Millions of Tons)

<u>State</u>	<u>Anthracite</u>	<u>Bituminous</u>	<u>Sub- Bituminous</u>	<u>Lignite</u>	<u>Total</u>
1. Montana		1,385.4	103,416.7	15,766.8	120,568.9
2. ILLINOIS		67,969.3			67,969.3
3. Wyoming		4,002.5	51,369.4		55,371.9
4. W. Virginia		38,606.5			38,606.5
5. Pennsylvania	7,109.4	23,727.7			30,837.1
6. Kentucky		26,000.9			26,000.9
7. Ohio		19,230.2			19,230.2
8. Colorado	25.5	9,144.0	4,121.3	2,965.7	16,256.5
9. Indiana		10,714.4			10,714.4
10. N. Dakota				10,145.3	10,145.3
All Other States	<u>236.2</u>	<u>28,143.7</u>	<u>9,517.6</u>	<u>4,738.8</u>	<u>42,636.3</u>
TOTAL USA	7,371.1	228,924.6	168,425.0	33,616.6	438,337.3

Source: 1981 Keystone Coal Industry Manual.

Montana has over 120 billion tons of reserves accounting for 27 percent of the U. S. coal reserves. Montana, Illinois and Wyoming combined have over half of all U. S. coal reserves. The location and type of coal in the United States are shown on Figure 4.

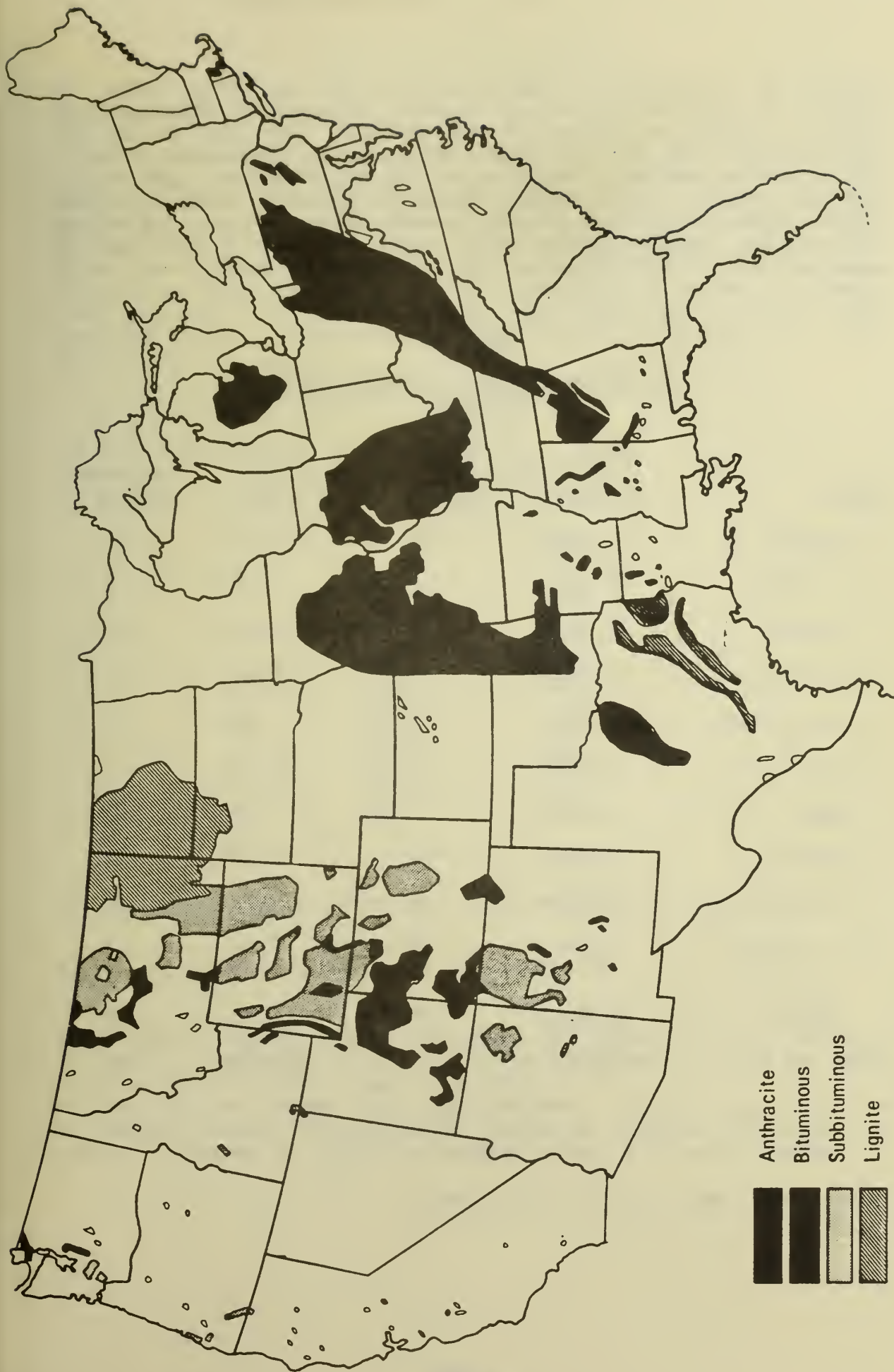


Figure 4
COAL FIELDS OF THE UNITED STATES

Source: 1981 Keystone Coal Industry Manual

Reserves of low sulphur coal varies widely across the United States. In contrast to Illinois' high sulphur reserves, 94 percent of Montana's coal reserves contain one percent or less sulphur. Over half of the 200 billion tons of one percent sulphur coal reserves in the United States are located in Montana. The distribution of 1.0 percent sulphur coal reserves by state for each of the top 10 reserve states is shown in Table 18. Illinois has nearly 68 billion tons of reserves but only 136 million tons are one percent sulphur coal. Montana has 121 billion tons of reserves of which 113 billion tons are one percent sulphur or less.

TABLE 18
1% SULPHUR RESERVES IN UNITED STATES
(Millions)

<u>State</u>	<u>Total Coal Reserves^a</u>	<u>% Reserves 1% or Less Sulphur</u>	<u>Tonnage of 1% Sulphur</u>	<u>% of U. S. 1% Sulphur Reserve</u>
1. Montana	120,568.9	94	113,335	57
2. ILLINOIS	67,969.3	0.2	136	0
3. Wyoming	55,371.9	66	36,545	18
4. W. Virginia	38,606.5	36	13,898	7
5. Pennsylvania	30,837.1	3	925	1
6. Kentucky	26,000.9	26	6,760	3
7. Ohio	19,230.2	1	192	0
8. Colorado	16,256.4	50	8,128	4
9. Indiana	10,714.4	5	536	0
10. N. Dakota	10,145.3	34	3,449	2
All Other States	<u>42,636.3</u>	37 Avg.	<u>15,775</u>	<u>8</u>
TOTAL USA	438,337.3		199,679	100

^a Total coal reserves represent the total amount of coal that is potentially mineable by either underground or surface methods, as defined by the U. S. Bureau of Mines and the U. S. Geological Survey.

Source: 1981 Keystone Coal Industry Manual.

ILLINOIS PRODUCTION

Illinois' production has fluctuated greatly over the last 60 years, from a high 78 million tons in 1921 to a low of 31 million tons in 1931. Production until recently reflected cycles in the national economy. During the last ten years, however, demand for coal has been greatly influenced by Federal and State clean air restrictions limiting the amount of sulphur dioxide released in the atmosphere. Even though Illinois has huge coal reserves, coal production is driven by demand. Coal companies in Illinois will only produce the quantity of coal they know will be sold. Statewide production from 1971 through 1981 is shown in Table 19.

TABLE 19

ILLINOIS COAL PRODUCTION (Millions)

	<u>Tons</u>
1971 ^a	58.4
1972	65.5
1973	61.5
1974 ^a	58.1
1975	59.5
1976	58.1
1977	53.9
1978 ^a	48.7
1979	59.5
1980	62.5
1981 ^a	53.7

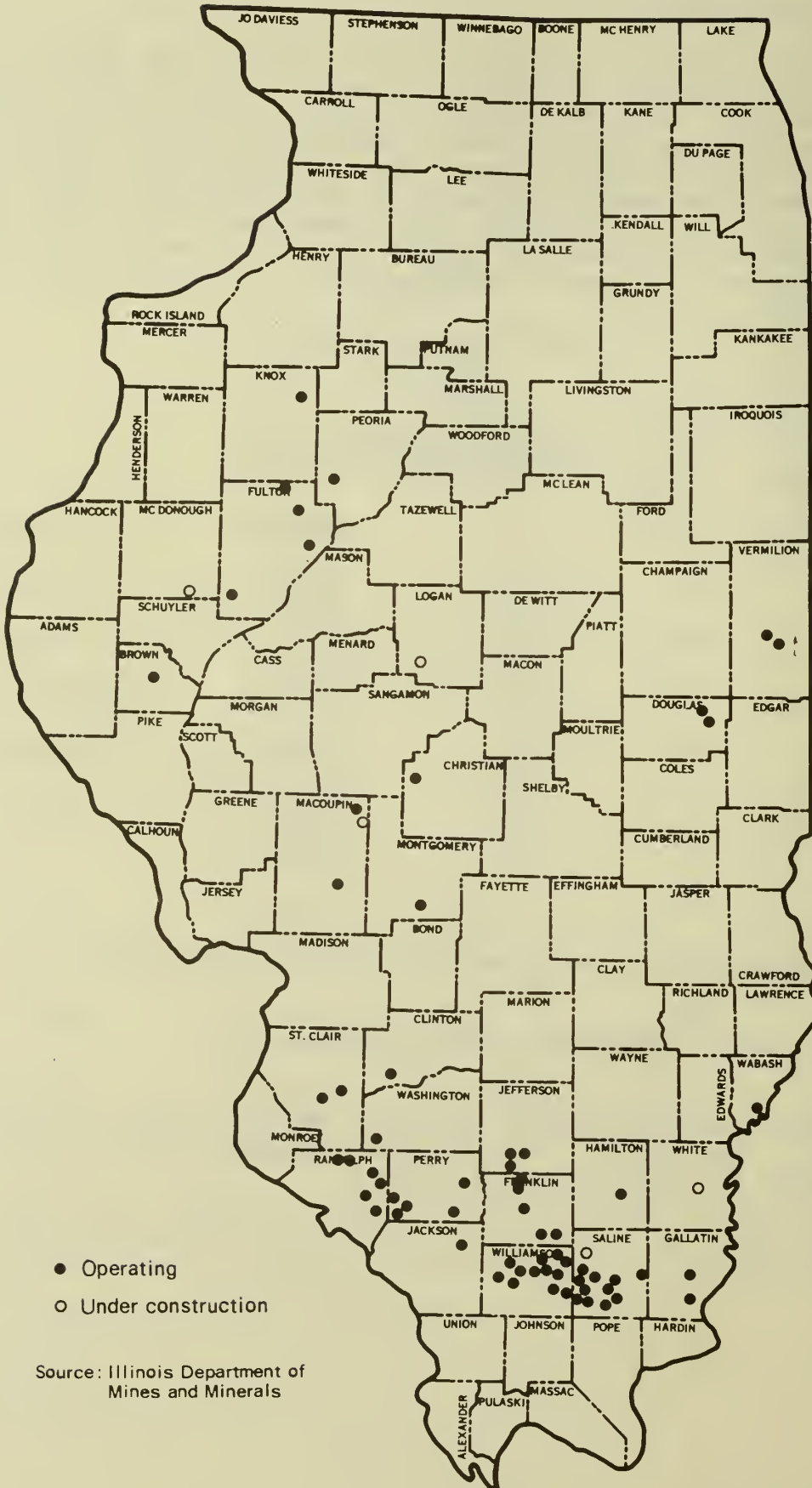
^a Coal miner strikes during these years reduced total output.

Source: Illinois Department of Mines and Minerals.

While many mines are located throughout the state, most are south of St. Louis. The location of all mines operating in 1980 or under construction in 1980 are shown on Figure 5.

Figure 5

ILLINOIS MINES IN 1980



Southwestern Illinois Coal Company's Captain Mine was the leading producer in 1980 with over 3.6 million tons. All Illinois mines and their respective production levels are listed by county in Table 20.

TABLE 20
ILLINOIS MINES

<u>County, Name of Operator and Mine</u>	<u>Tons of Coal Produced in 1980</u>
<u>BROWN COUNTY</u>	
Great American Energy, Big Eagle #1	494
<u>CHRISTIAN COUNTY</u>	
Peabody Coal Co. #10	2,887,503
<u>CLINTON COUNTY</u>	
Monterey Coal Co. #2	2,089,261
<u>DOUGLAS COUNTY</u>	
Zeigler Coal Co., Murdock	1,202,821
Zeigler Coal Co. #5	1,514,359
<u>FRANKLIN COUNTY</u>	
Old Ben Coal Co. #21	1,327,952
Old Ben Coal Co. #24	994,427
Old Ben Coal Co. #25	1,621,985
Old Ben Coal Co. #26	1,286,574
Old Ben Coal Co. #27	866,840
<u>FULTON COUNTY</u>	
Amax Coal Co., Sunspot	1,265,034
Consolidation Coal Co., Norris	63,649
Freeman United Coal Mng., #17	944,029
Midland Coal Co., Rapatee	530,400
<u>GALLATIN COUNTY</u>	
Peabody Coal Co., Eagle Surface	113,112
Peabody Coal Co., Eagle #2	967,283
<u>HAMILTON COUNTY</u>	
Inland Steel Coal Company	288,150
<u>JACKSON COUNTY</u>	
Consolidation Coal Co. Burning Star #5	2,215,188

<u>County, Name of Operator and Mine</u>	<u>Tons of Coal Produced in 1980</u>
<u>JEFFERSON COUNTY</u>	
Freeman United Coal Mining, Orient #3	1,965,155
Freeman United Coal Mining, Orient #6	400,111
Inland Steel Coal Company #1	2,006,680
<u>KNOX COUNTY</u>	
Midland Coal Company, Mecco	269,743
<u>LOGAN COUNTY</u>	
Turris Coal Company, Elkhart	under construction
<u>MCDONOUGH COUNTY</u>	
Freeman United Coal Co., Industry Mine	under construction
<u>MACOUPIN COUNTY</u>	
Freeman United Coal Mining, Crown II	1,630,255
Freeman United Coal Mining, Crown III	under construction
Monterey Coal Company, #1	2,913,264
<u>MONTGOMERY COUNTY</u>	
Consolidation Coal Company	1,915,252
<u>PEORIA COUNTY</u>	
Midland Coal Company, Elm Mine	476,325
<u>PERRY COUNTY</u>	
Amax Coal Company, Leahy	2,713,357
Consolidation Coal Co., Burning Star #2	1,897,830
Consolidation Coal Co., Burning Star #4	1,422,260
Freeman United Coal Mining, Fidelity #11	1,285,900
Southwestern IL Coal Corp., Captain Mine	3,610,869
<u>RANDOLPH COUNTY</u>	
Consolidation Coal Co., Burning Star #3	1,098,048
Peabody Coal Co., Baldwin Mine	1,518,857
Peabody Coal Co., River King Surface #6	2,769,369
Southwestern IL Coal Corp., Streamline Mine	1,845,183
Zeigler Coal Company, Spartan Mine	431,321
Zeigler Coal Company, #11	692,750
<u>ST. CLAIR COUNTY</u>	
Peabody Coal Co., River King Pit #3	856,890
Peabody Coal Co., River King U/G	1,349,136

<u>County, Name of Operator and Mine</u>	<u>Tons of Coal Produced in 1980</u>
<u>SALINE COUNTY</u>	
A & G Coal Company, #1	5,957
Equality Mining Company, #1	240,601
J. J. Track Mining Co., Inc.	
Brown Brothers #2	37,230
Jader Fuel Company, Inc. #1	63,761
Jader Fuel Company, Inc.	
Federal Landscaping #1	196
Kennellis Energies, Inc.	
Brushy Creek Mine	279,796
Kerr-McGee, Galatia Mine	under construction
Peabody Coal Co., Will Scarlet	761,838
Sahara Coal Company #6	569,065
Sahara Coal Company #20	348,122
Sahara Coal Company, #21	458,186
Sahara Coal Company, #22	70,213
<u>VERMILION COUNTY</u>	
Lee Coal Company, Surface	28,275
Coal Producers, Inc., Calefy Mine	69,748
<u>WABASH COUNTY</u>	
Amax Coal Company, Wabash Mine	1,966,295
<u>WASHINGTON COUNTY</u>	
Peabody Coal Company, Marissa Mine	424,680
<u>WHITE COUNTY</u>	
Mapco Mining, White County Mine	under construction
<u>WILLIAMSON COUNTY</u>	
Amax Coal Company, Delta	2,137,292
Classic Coal Corp. #5	406,614
Cold Water Coal Company, #2	459
E & B Coal Company, Corinth	9,673
E & B Coal Company, #2	35,481
Freeman United Coal Mining, Orient #4	874,777
Jader Fuel Co., Inc. #2	32,570
Malone Mine #1	0
North Side Mine	9,234
Riggs Mining Company, #2	7,619
Williamson Coal Company #1	256,813
Zeigler Coal Company, #4	200,306

Source: Illinois Department of Mines and Minerals.

NATIONAL PRODUCTION

Production of coal in the United States exceeded 800 million tons in 1981. Illinois produced nearly 54 million tons representing 6.7 percent of the U. S. total. The 10 largest producing states and their respective tonnages are listed in Table 21. As can be seen from this table, Illinois is ranked fifth nationally. Kentucky, the leading producer, mined nearly three times as much coal as Illinois.

TABLE 21

TOP PRODUCERS OF COAL BY STATE
(Millions)

	<u>1980 Tons</u>	<u>%</u>
1. Kentucky	155.0	19.3
2. West Virginia	108.5	13.5
3. Wyoming	104.0	13.0
4. Pennsylvania	66.0	8.2
5. ILLINOIS	53.7	6.7
6. Virginia	46.4	5.8
7. Montana	34.2	4.3
8. Ohio	33.5	4.2
9. Texas	32.5	4.1
10. Indiana	<u>27.8</u>	<u>3.5</u>
Total Top 10 States	661.6	82.6%
Total United States	802.8	100.0%

Source: 1981 Keystone Coal Industry Manual.

CHARACTERISTICS OF ILLINOIS COAL

Even though Illinois has extensive quantities of bituminous coal, it is the quality of the coal that will likely determine its future marketability. While quality of the coal varies from one county to the next, Illinois coal is typically high sulphur (2-5%) and high BTU (10,000-13,000/lb.). About 90% of Illinois' production comes from only two of the eight seams, Herrin (No. 6) and Springfield-Harrisburg (No. 5).²⁴ Characteristics of these two seams are shown in Table 22 below.

TABLE 22
CHARACTERISTICS OF ILLINOIS COAL

	<u>No. 5</u>	<u>No. 6</u>
% moisture	4-18	8-20
% volatile matter	34-39	31-41
% fixed carbon	34-55	35-44
% ash	8-12	7-13
caloric value (BTU/lb.)	10,400-12,700	9,700-11,400
% sulphur	2-5	1-5

Source: Illinois State Geological Survey.

The moisture content of coal is simply the amount of water in the coal. Generally, the lower the moisture content, the better the heat content of the coal.

Volatile matter is a substance in coal that creates spontaneous combustion. The lower the percentage of volatile matter, the less likely the coal will ignite spontaneously. Illinois coal in general has a high percentage of volatile matter and has been known to ignite in railroad cars and barges. For this reason it is less desirable than other coals.

Fixed carbon is that part of coal that burns. The higher the fixed carbon content, the greater the heat content in the coal.

²⁴ The other six coal seams are Rock Island (No. 1): Murphysboro: DeKoven and Davis: Colchester (No. 2): Summum (No. 4): and Danville (No. 7).

The ash content in coal is the foreign matter that will not burn and is made up of shale, clay and calcium fragments. The greater the ash content, the less heat content is in the coal.

Caloric value or BTUs per pound is the heat value of the coal. The heat value is determined by the amount of moisture, carbon and ash in the coal. A higher heat value in a pound of coal would require less coal to be burned.

The sulphur content in coal is responsible for much of the pollution generated by users. The lower the sulphur content, the less sulphur dioxide is emitted when the coal is burned.

APPENDIX B: DOMESTIC MARKETS FOR ILLINOIS COAL

OVERVIEW

- o Current major markets for Illinois coal include Illinois, Missouri and Indiana. By 1990 Florida and Georgia will also receive major shipments of Illinois coal.
- o Despite increasing national demand for low cost fuels such as coal, Illinois coal has lost ground to Eastern and Western coal producers.
- o The Clean Air Act of 1970 is the primary reason why Illinois coal has lost markets over the past decade.
- o Legislative changes in scrubber requirements and new acid rain legislation could be devastating to the Illinois coal industry.
- o While many technologies exist to remove the sulphur content in coal, only flue gas desulphurization systems (scrubbers) are economically viable on a commercial scale at this time.
- o If Illinois producers are to improve their market share, they must reduce the delivered price of their coal. The single largest cost factor of the delivered price is the cost of coal production.
- o In the Midwest, Illinois coal generally has a transportation cost advantage over other U. S. coals.

MARKETS FOR ILLINOIS COAL

Illinois coal is primarily used by utilities to produce electricity. Utility purchases represent approximately 90 percent of Illinois coal sales. The remaining 10 percent is used in various forms of manufacturing and cement production. Unlike industrial users that usually purchase coal on the spot market, utilities generally enter contracts with mining companies that span 25 to 30 years. Electric utilities are concerned about the continuity and reliability of their coal supply. They will forego a less costly but less reliable coal for one that will provide an uninterrupted flow.

In 1980, Illinois mines shipped over 62.5 million tons of coal within Illinois and to eleven other states. About 56 million tons of coal was identified in the study, accounting for 90 percent of the total coal produced. As shown in Table 23 about one-third of the production identified in the study was shipped to utilities and industries in Illinois. Other major buyers include Missouri with 22 percent and Indiana with 19 percent of the total identified production. Long-term contract coal purchases in 1980 exceeded 42 million tons; about 76

TABLE 23

MARKET DISTRIBUTION OF ILLINOIS COAL FOR 1980 AND 1990
(Thousands)

State	Total Tons		Total Contract Tons			
	1980	%	1980	%	1990	%
Illinois	18,761	34%	16,046	36%	17,575	32%
Missouri	12,178	22%	9,046	23%	15,580	28%
Indiana	10,662	19%	6,981	17%	9,505	17%
Georgia	4,980	9%	4,980	10%	5,000	9%
Wisconsin ^a	3,618	6%	2,242	6%	35	--
Florida	1,967	4%	1,967	3%	5,250	9%
Iowa	1,810	3%	789	3%	2,025	4%
Minnesota	1,161	2%	710	2%	295	1%
Michigan	313	1%	--	--	--	--
Alabama	156	--	0	--	0	0
Kentucky	126	--	0	--	0	0
Tennessee	122	--	0	--	0	0
Mississippi	113	--	0	--	0	0
TOTAL ^b	55,967 ^c	100%	42,761	100%	55,265	100%

^a A review of Wisconsin utility coal contracts for Illinois coal indicates there are 2.185 million tons under contract for 1985.

^b Total 1980 production was 62.5 million tons. The study total of 58,429 thousand accounts for 93 percent of Illinois coal produced that year; of the study total, 49 million was identified as coal under long-term contract.

^c Does not include 3.04 million tons of coal to unspecified destinations.

Source: Illinois Department of Transportation survey of utilities, mines and transportation companies, and research of published information on mine-utility contracts.

percent of total coal sales. The remainder of the coal was purchased on the spot market or sold by contract for a 3-year or less term. Other important consumers are Georgia, Wisconsin, Iowa, Florida and Minnesota; each buying more than one million tons. The primary markets for Illinois coal are depicted on Figure 6.

Based on existing long-term coal contracts, Illinois will remain the largest buyer of Illinois coal in 1990, but will take a smaller portion of the Illinois coal market. Illinois purchases of coal will continue to represent about one-third of total production. Missouri and Indiana will also remain as the second and third largest consumers of Illinois coal with 28 percent and 17 percent, respectively. Missouri will purchase over 6 million more tons of Illinois coal by long-term contract, representing a 72 percent increase; and Indiana will purchase 36 percent more coal under long-term contract.

The most significant increase in Illinois coal sales is to Florida where shipments will increase by 165 percent to 5.3 million tons. Georgia will also continue to represent a major market for Illinois coal, buying nearly 5 million tons per year. No long-term contracts with utilities in Michigan, Alabama, Kentucky, Tennessee and Mississippi were identified.

During the seventies, Illinois coal shipments to Wisconsin declined slightly while purchases of Western coal increased. Looking to the future, nearly all of Wisconsin's long-term contracts expire between 1985 to 1990. The decrease in long-term contracts may indicate a continuation of this trend.

The key market states of Illinois, Missouri, Indiana, Florida and Georgia combined will consume 95 percent of the 55 million tons projected to be purchased under long-term contract by utilities in 1990. These five states provide Illinois coal producers the majority of the Illinois coal market.

Illinois

Due to the close proximity to Illinois mines, Illinois utilities and industrial users have a reliable source of coal delivered at lower transportation costs than from non-Illinois mines. On Figure 7 the amount of coal burned by each utility and the amount of Illinois coal received by each utility are shown. The largest user of Illinois coal in Illinois is Illinois Power's Baldwin Plant, which burns over 4.3 million tons of coal per year. Commonwealth Edison's Kincaid plant is second, burning 3.1 million tons of coal.

Missouri

Illinois producers ship predominantly to eastern Missouri utilities due to the short distance from the mines in Southern Illinois. The utilities using Illinois coal are shown on Figure 8. Illinois coal producers are also able to extend their market in the Kansas City Metropolitan area

Figure 6

STATES RECEIVING MAJOR SHIPMENTS OF ILLINOIS COAL

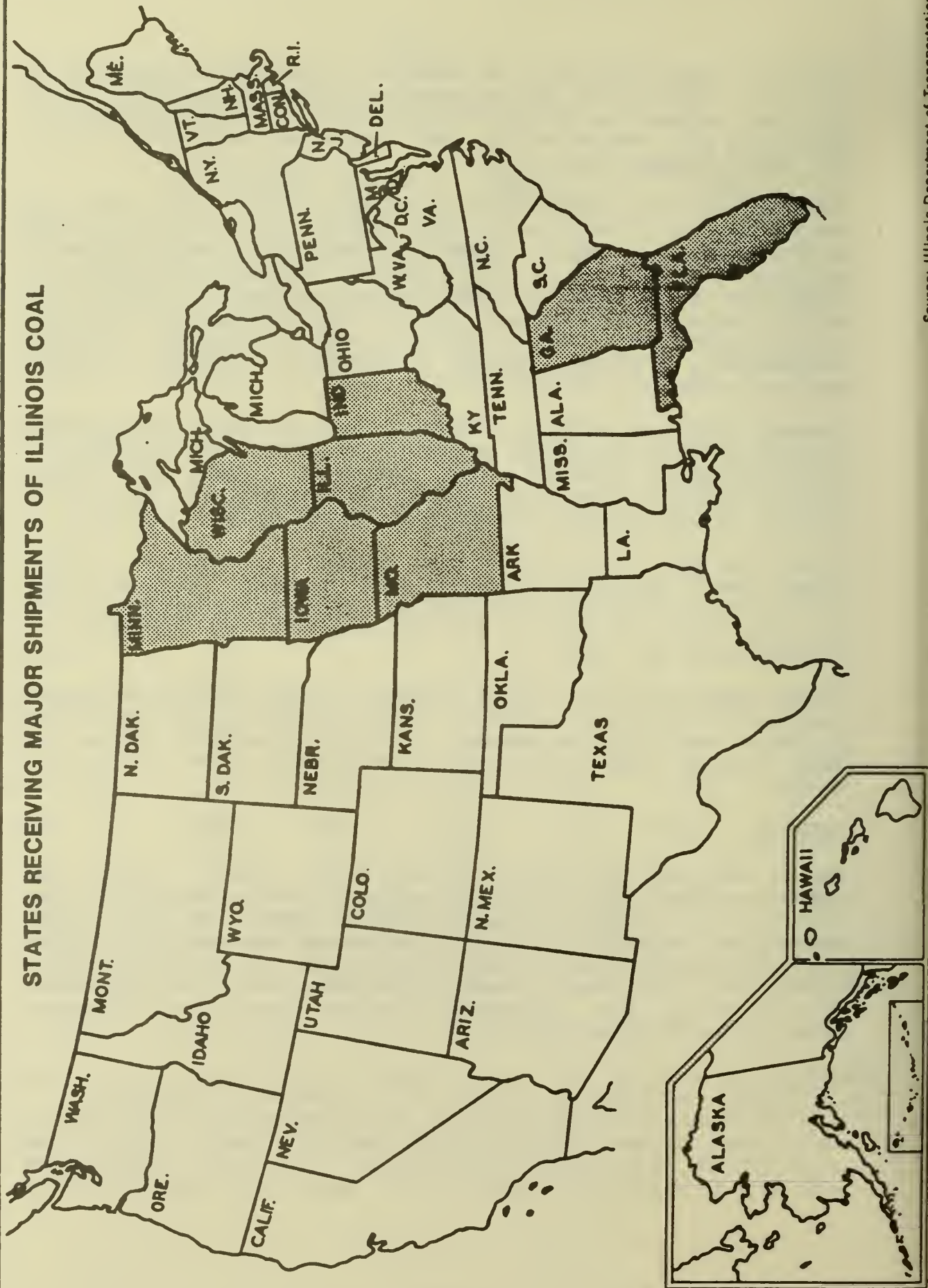


Figure 7

UTILITIES IN ILLINOIS IN 1980

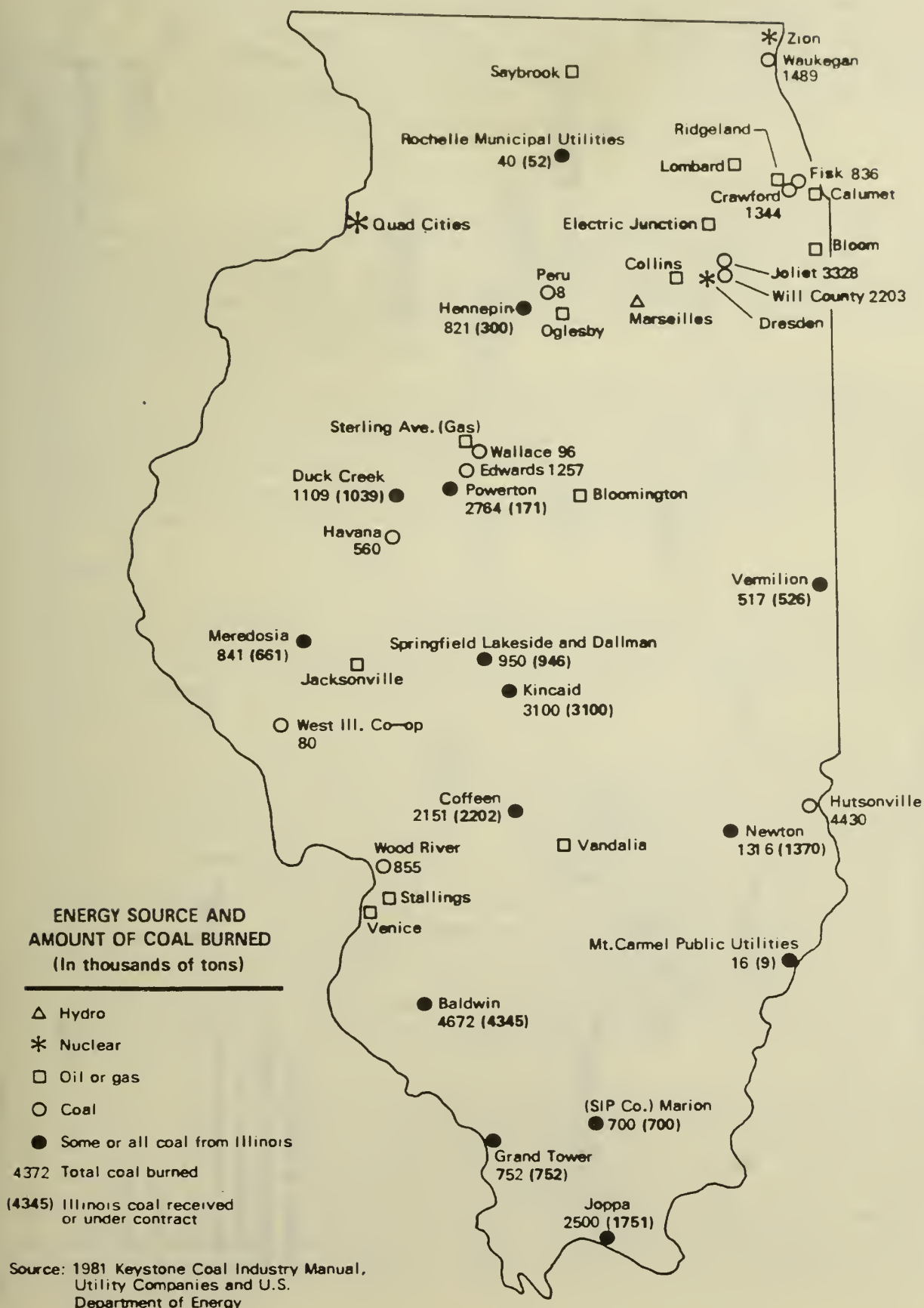
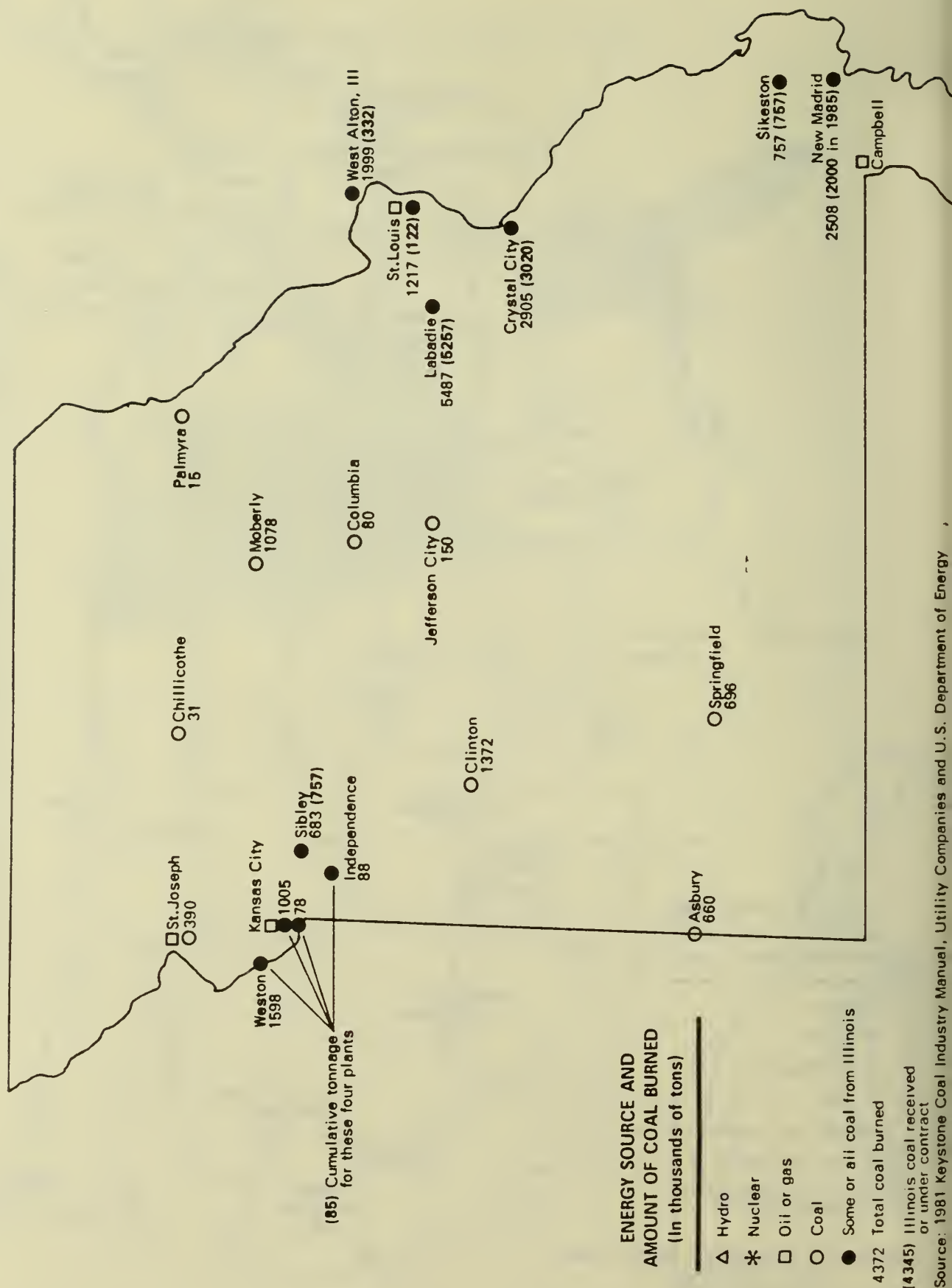


Figure 8

UTILITIES IN MISSOURI IN 1980



because of the direct main line rail service between St. Louis and Kansas City. In 1980, Union Electric's Labadie plant located on the Missouri River 25 miles west of St. Louis not only received the greatest amount of Illinois coal in Missouri, but was the second largest user of Illinois coal for all plants. Over 5 million tons was shipped to this plant via the MP. Union Electric also operates the Rush Island plant at Crystal City that receives over 3 million tons of coal. Union Electric burns more Illinois coal than any other utility company.

Indiana

Indiana utilities have similar advantages in transportation costs as does Missouri and Illinois. Illinois mines serve five electric plants in Indiana, three of which are in the Gary area. The Indiana market area for Illinois coal would probably be limited to Southern Indiana utilities without mainline service provided by the MP and ICG between Southern Illinois coal fields and Chicago.

As shown on Figure 9, the major users are located in Carol, Michigan City and Merom. The Public Service Company of Indiana's Gibson Plant at Carol, Indiana is the single largest user of Illinois coal in the United States. The Gibson plant receives nearly 6 million tons of Illinois coal representing 71 percent of Indiana's utility consumption of Illinois coal. Amax's Wabash Mine provides all the Gibson plant's coal.

Florida

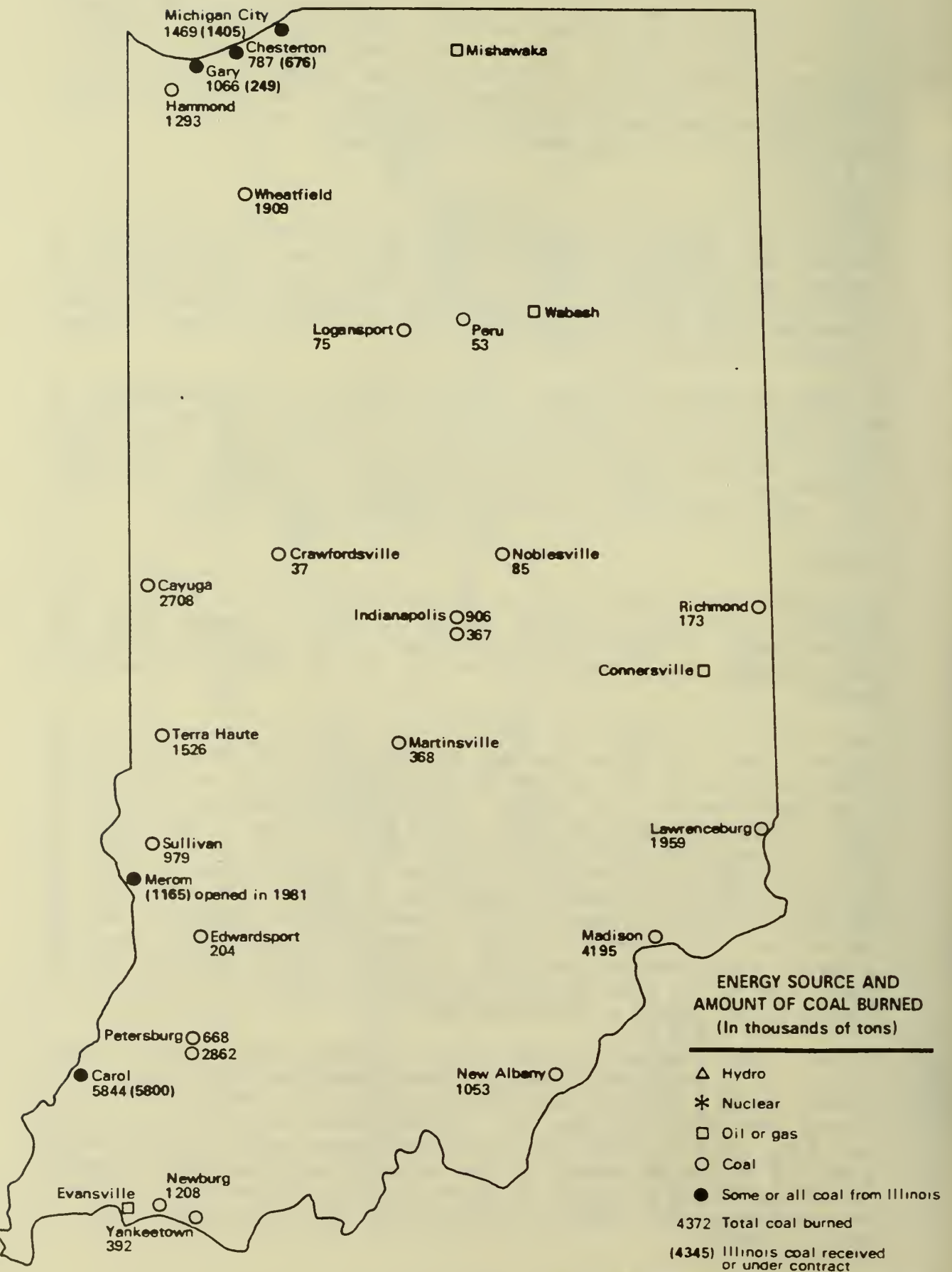
The market that holds the most growth potential for Illinois coal producers is Florida. Florida is one of the few growth areas for Illinois coal. In 1980, Florida utilities received only 4 percent of the coal shipments under long-term contract, but by 1990 will receive 9 percent.

The increase in demand for Illinois coal can be attributed by two factors. The first factor has been the increasing use of coal as a low cost alternative to oil. Of the 40 existing plants, 28 are oil-burning, 8 are coal-fired and 4 are nuclear. Based on projections by the Electric Power Coordinating Group of Tampa, there will only be 21 oil plants by 1991, 29 coal-fired plants and 5 nuclear plants. Total utility coal use will rise from 7.6 million tons in 1982 to 24.6 million tons by 1990. Of the 15 electric plants under construction in Florida, 14 are coal-fired and one is nuclear. However, due to conservation by consumers and the current recession, several of these planned coal-fired plants have been temporarily suspended or cancelled altogether. Also, many of the new plants will not be able to burn high-sulphur coal, but will install dry scrubbers that require a low sulphur coal.

Illinois coal's growth in the Florida market, not currently under contract, will likely be limited to plants that blend both high and low sulphur coals. Illinois penetration into the all high sulphur coal plants with wet scrubbers has largely taken place with existing contracts. It is unlikely that the Florida market will reach the tonnage levels of Indiana or Missouri as the entire high sulphur coal market in Florida by 1990 is projected to reach only 9.9 million tons. Florida's coal requirements for 1980 and 1990 of high and low sulphur coals are shown in Table 24.

Figure 9

UTILITIES IN INDIANA IN 1980



Source: 1981 Keystone Coal Industry Manual, Utility Companies and U.S. Department of Energy

TABLE 24

FLORIDA'S COAL REQUIREMENTS
(Millions of tons)

	<u>1980</u>	<u>1990 Low Estimate</u>	<u>1990 High Estimate</u>
Low Sulphur	5.1	12.2	12.2
High Sulphur	3.6	9.9	9.9
Unknown ^a	<u>0</u>	<u>0</u>	<u>8.3</u>
Total	8.7	22.1	30.4

^a The unknown estimate of 8.3 million tons could be all low sulphur coal, all high sulphur coal or a combination of the two.

Source: 1982 Ten Year Plan State of Florida prepared by the Florida Electric Power Coordinating Group, Inc.

The second factor is that all Florida utilities receiving Illinois coal are either located on the Intercoastal Waterway making all-barge movement from Illinois possible or are located inland but receive coal via a barge-rail combination. The geographic distribution of Florida's utilities is shown on Figure 10. The low-cost of barge movements extend Illinois markets to Florida. The largest Florida consumer of Illinois coal by 1985 will be Tampa Electric's Big Bend plant with 1.8 million tons closely followed by Seminole Electric's plant at Picolata with 1.2 million tons.

Georgia

Utilities in Georgia also represent a significant market for Illinois coal. Nearly 5 million tons of coal was shipped to two Georgia Power plants in 1980. As shown on Figure 11, both the Yates and Wansley plants burn about 2.5 million tons of Illinois coal. This market has levelled off to 5 million tons by 1990 and likely will remain stable as most plant expansions will require low sulphur coal, which can be obtained from mines closer than Illinois. Coal is moved to Georgia Power by an intermodal combination of rail-barge-rail. It is shipped by rail to docks in Illinois and Kentucky, then transloaded onto barges and shipped down the Tennessee River to Pride, Alabama. At Pride, the coal is reloaded onto rail and delivered to plants in Georgia. As in other states, Illinois coal is competitive in Georgia due to the lower transportation costs that keep the total delivered price of the coal competitive.

UTILITIES IN FLORIDA IN 1980

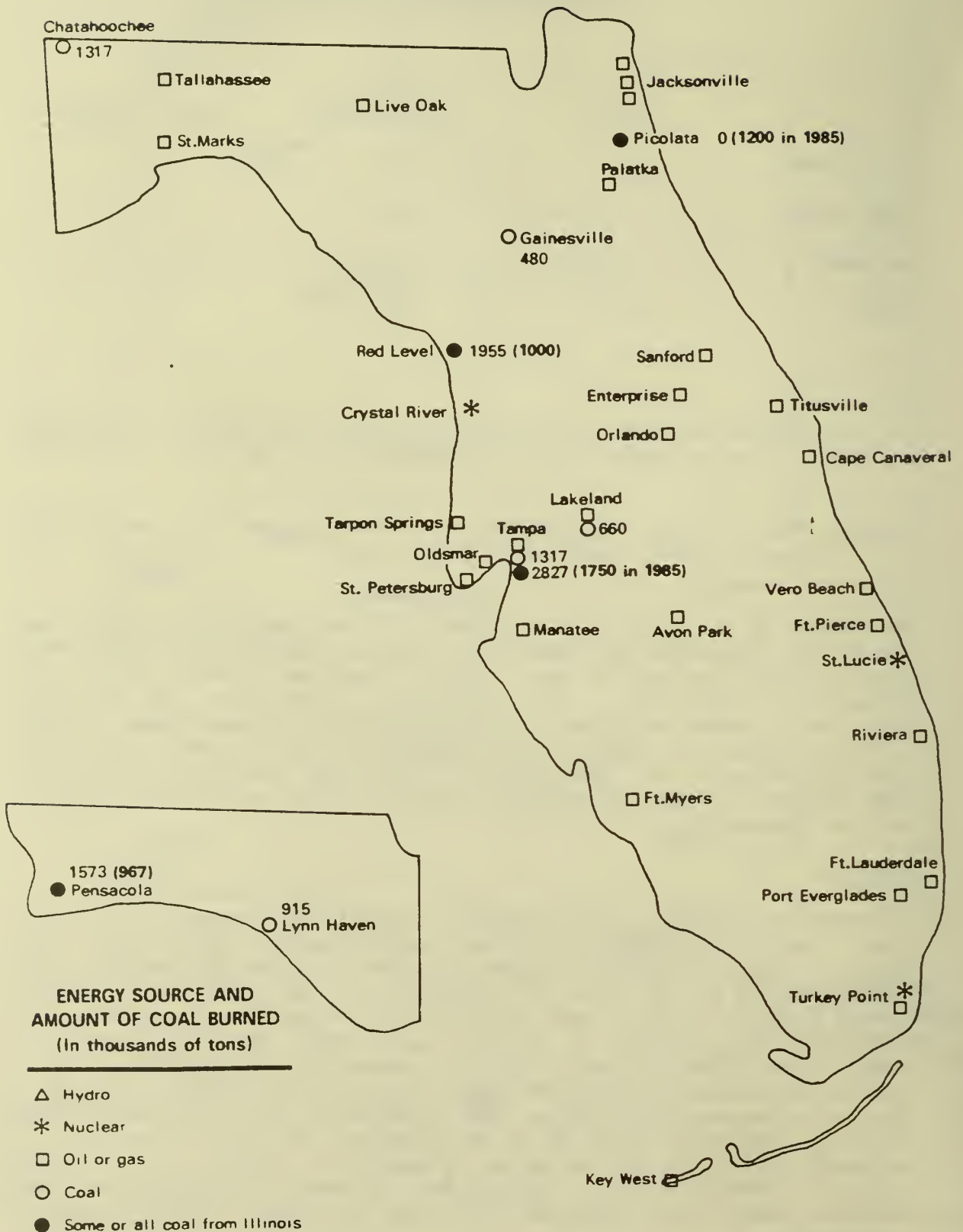
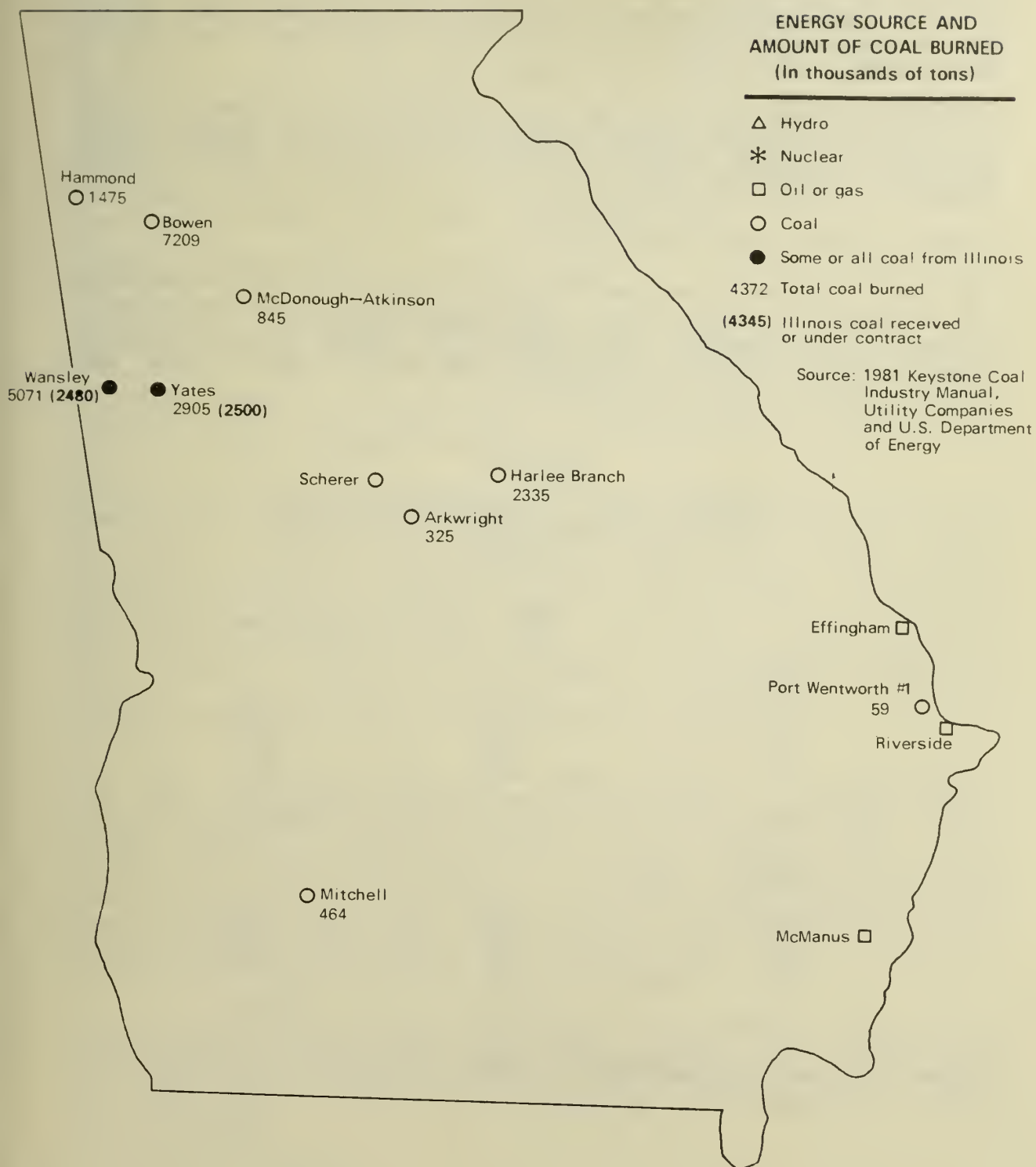


Figure 11

UTILITIES IN GEORGIA IN 1980



INDUSTRIAL USERS

Another market for Illinois coal is in industrial use. In 1980 about 5 million tons of Illinois coal was used for industrial purposes. Nearly half of this tonnage went to the Inland Steel plant in East Chicago, Indiana. Inland owns 2 mines in Illinois, one near Sesser and another near McLeansboro. These mines are the sole supplier for Inland Steel's East Chicago plant.

The remaining tonnage is used by many manufacturers and cement producers located in the Midwest. Estimates of industrial coal use beyond 1980 are difficult to project, since industries rarely buy coal under contracts with more than a 2-3 year term.

DEMAND FOR COAL VERSUS OTHER FUELS

The use of all coals has generally grown as utilities switch over from oil and gas-fired plants to less costly alternatives. Coal has grown at an average 2.5 percent per year between 1975 through 1979. All of this growth has been in the utility sector. Nationwide trends in fossil fuel usage by utilities are shown in Table 25.

TABLE 25
NATIONAL FOSSIL FUEL USAGE BY UTILITIES
(Trillions)

	<u>BTU</u>	<u>%</u>
<u>1975</u>		
Coal	5,319	83.8
Oil	662	10.4
Gas	<u>368</u>	<u>5.8</u>
Total	6,349	100.0
<u>1979</u>		
Coal	6,965	86.6
Oil	753	9.4
Gas	<u>318</u>	<u>4.0</u>
Total	8,036	100.0

Source: Illinois State Geological Survey.

Coal usage by utilities has increased from a 83.8 percent share in 1975 to 86.6 percent in 1979. While actual usage of oil increased in 1979, in relative terms it declined by 1 percent.

Nuclear power, while slowing nationally, will continue to grow in Illinois through the next decade. In 1978, nuclear power accounted for 24 percent of the total generated output, while high sulphur coal accounted for 40 percent and low sulphur coal 29 percent. Nuclear power will also account for 66 percent of Illinois' utility megawatt expansion through 1993. In 1988 nuclear power is estimated to increase to 44 percent of generation output. High and low sulphur coals will both fall to 29 percent and 24 percent of generation output respectively. With the additional construction of reactors by Commonwealth Edison and Illinois Power, nuclear power is the chief competitor of coal.

COMPETITION FROM WESTERN AND EASTERN COALS

In the last ten years, competition from Western and Eastern coal producers caused a decrease in consumption of Illinois coal. The shifts that occurred from 1975 to 1979 in shipments from the Illinois Basin (Illinois, Kentucky, and Indiana) are shown on Figure 12. While some gains were made in individual states, an overall loss of 11 million tons can be attributed to competition from Western and Eastern producers.

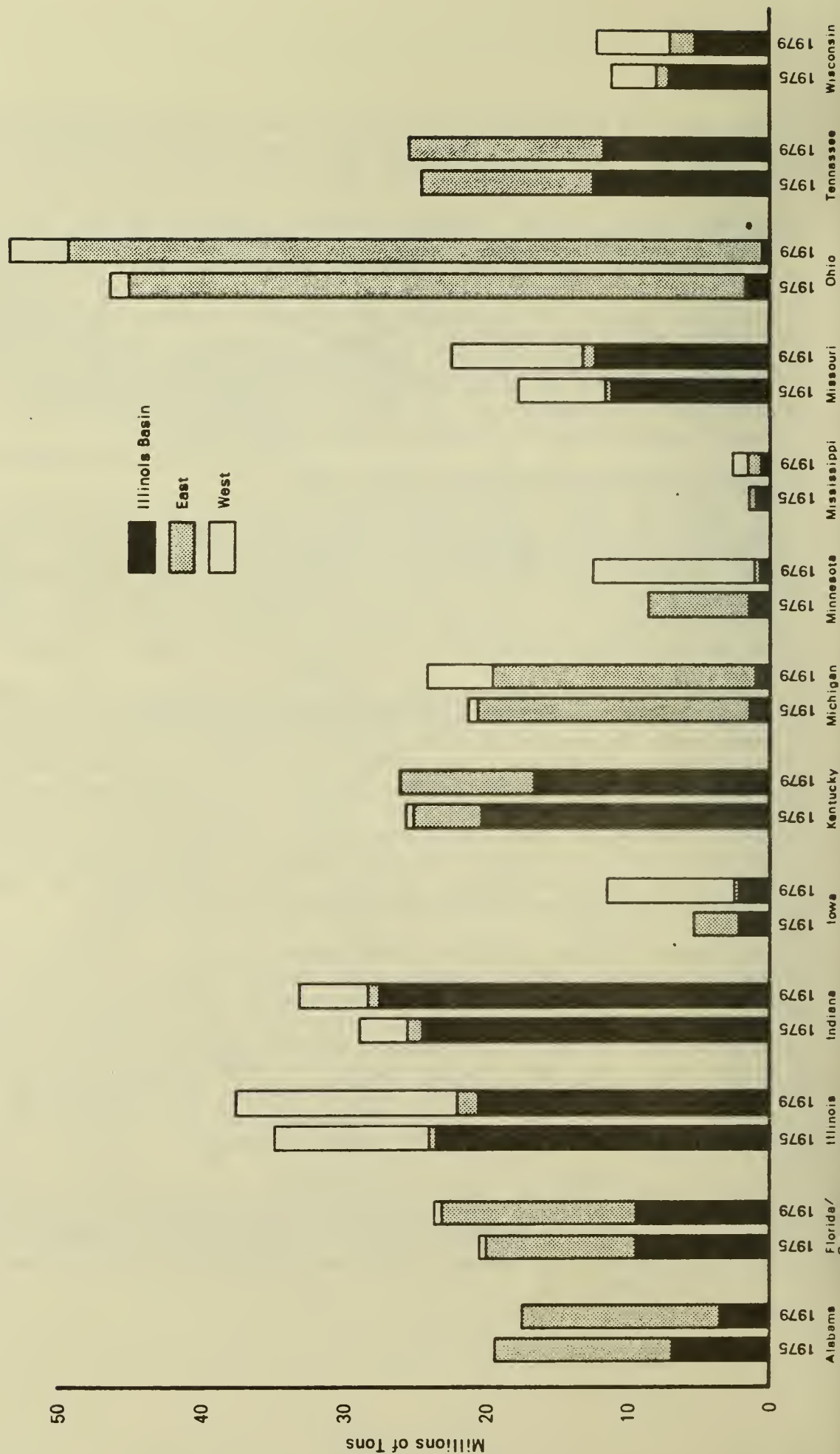
Blending high and low sulphur coals gives Illinois coal producers a larger market share than could otherwise be obtained. Utilities blend these coals to comply with environmental standards and to minimize their fuel costs. Utilities that blend coals could surpass environmental standards by burning low sulphur Western and Eastern coal entirely but would also incur additional fuel costs. Most other Illinois utilities burn a mixture of high and lower sulphur Illinois coal. Utilities mix Illinois coals to comply with environmental standards and to minimize their fuel costs as well. Utilities are looking for the most cost effective means of satisfying the environmental standards.

Only three Illinois utilities blend higher sulphur Illinois and Indiana coal with low sulphur Western and Eastern coals. Illinois Power's Hennepin and Havana plants and Commonwealth Edison's Will County plant blended 323,000 tons of Illinois Basin coal with 3,455,000 tons of low sulphur coal in 1980. The Hennepin plant however is the only plant that blends these coals on a regular basis. In 1980 Hennepin received 300,000 tons of Illinois coal, 337,000 tons of Western coal and 193,000 tons of Eastern Kentucky coal. Nearly 93 percent of the Illinois Basin coal blended by Illinois utilities is burned at Hennepin.

Non-Illinois utilities that blend Illinois coal and low sulphur coal include Union Electric's Rush Island plant at Crystal City, Missouri and the Labadie plant at Labadie, Missouri. Both plants combined burn nearly 5.5 million tons of Illinois coal accounting for 65-75 percent of the total fuel used.

Figure 12

CHANGES IN MARKET SHARES OF ILLINOIS BASIN, EASTERN AND WESTERN COAL



There are four factors that continually influence the demand for Illinois coal. The impact of these factors on demand will shape the future for many years.

- o Environmental standards
- o Coal beneficiation (coal washing)
- o Flue gas desulphurization and other technologies
- o Cost of delivered coal

Environmental Standards

While many environmental standards have become law in the past several years, there has not been one law that has had more impact on the demand for Illinois coal than the Clean Air Act of 1970. The Clean Air Act established emission standards for urban and rural utilities. The Act requires all new plants built after 1970 to meet a standard of 1.2 pounds of sulphur dioxide per one million BTUs of heat. This applies to all utilities with a heat output of 73 megawatts or larger. Rural utilities built prior to 1970 must meet a standard of 6.8 pounds of sulphur dioxide per million BTU. Utilities in Peoria, Chicago and St. Louis built before 1970 must meet a 1.8 pounds of sulphur dioxide per million BTU standard.

To meet the clean air standard, utilities could either install costly and unproven flue gas scrubbers or burn low sulphur coal. Many utilities chose the latter. Also the additional cost of transporting Western coal could be passed on to consumers whereas the high capital cost of a scrubber had to be borne by the utility. The deadline for meeting the standards established in the Clean Air Act was December 31, 1982. As of March 1983, no extension of this deadline had been granted, except for utilities with a court-approved compliance plan. Most utilities have either initiated their plans to comply with the standards or are currently in compliance. For the few plants having difficulty complying with clean air standards, action may be taken by EPA for non-compliance.

The New Source Performance Standards (NSPS) program in the Clean Air Act, as revised in June of 1979, now calls for all scrubbing of coal at plants that started construction after September 18, 1978 regardless of the sulphur content in the coal. While older plants may continue burning low sulphur coal without scrubbers, new plants are required to install them. While it would appear that this amendment would create additional demand for Illinois coal, this is only partially true. Burning Illinois coal requires a wet scrubbing process to sufficiently reduce sulphur emissions, while low sulphur coal requires a simpler dry scrubbing process. The cost differential is still likely to favor the use of low sulphur coal in certain markets. As a result, in those areas where it has been more expensive to burn Illinois coal, the disadvantage could increase, while in other areas where delivered price of Illinois coal has historically been cheaper than low sulphur coal, the advantage may decrease.

Recently there has been an interest by Congress to modify the NSPS standards. Currently, Western coal must be scrubbed to remove 70 percent of the sulphur dioxide. Illinois coal must be scrubbed so that 90 percent of the sulphur dioxide is removed. These percentage requirements are contested by many utilities. These utilities believe that as long as the 1.2 pounds of sulphur dioxide per million BTU standard is met, a percentage reduction is unnecessary and simply protects high sulphur coal mining interests. The modifications to legislation would include abolishing this percentage reduction requirement. There are currently no Illinois utilities scrubbing Western coal.

Illinois coal has made modest gains in Indiana and Missouri and to a lesser extent in Southeastern states. Removal of the percent reduction requirement could eliminate potential growth in the Southeastern market, if utilities switched to low sulphur Eastern coal. Indiana and Missouri could also switch to low sulphur coal to power their future plants. Without the percentage reduction requirement, additional markets for Illinois coal would not be realized.

As shown on Figure 13, less than 1 percent of Illinois' coal would be acceptable without scrubbing according to the requirements in the Clean Air Act of 1970. All reserves of Illinois coal are also shown on this graph. Coal with the proper sulphur and BTU content that yields 1.2 pounds of sulphur dioxide per million BTU is shown above the line.

The most damaging issue that could affect the sale of Illinois coal is the pending acid rain legislation. This legislation would reduce sulphur dioxide emissions of plants built before 1978 from current levels to 1.2-1.5 pounds of sulphur dioxide per one million BTUs. At present, older rural utilities are allowed 3.6 to 7.4 pounds of sulphur dioxide per one million BTUs based on location and exhaust stack height. In the 1982 session there were two bills in Congress concerning acid rain and there has been interest in introducing similar legislation this session. Under the provisions of either bill, Illinois utilities could be faced with reducing sulphur dioxide levels to 596,900 tons under the Moynihan Bill or to 741,800 tons under the Mitchell Bill. According to the Moynihan and Mitchell Bills, utilities would have to curtail 65 to 81 percent of their sulphur dioxide emissions respectively. In order to comply with either the Moynihan or the Mitchell Bill, most utilities would probably switch to low sulphur Western or Eastern coals. Plants that would continue to burn Illinois coal would be those with a scrubber already operating or plants able to make a capital investment in a scrubber worthwhile. An investment in a scrubber would most likely be considered by new plants, not older than 10-15 years, or plants close to their source of coal and receiving a good price.

While specific reductions in Illinois coal production due to acid rain legislation are difficult to project at this time, the Illinois Environmental Protection Agency anticipates major losses if the legislation passes. These losses would most likely occur in Illinois,

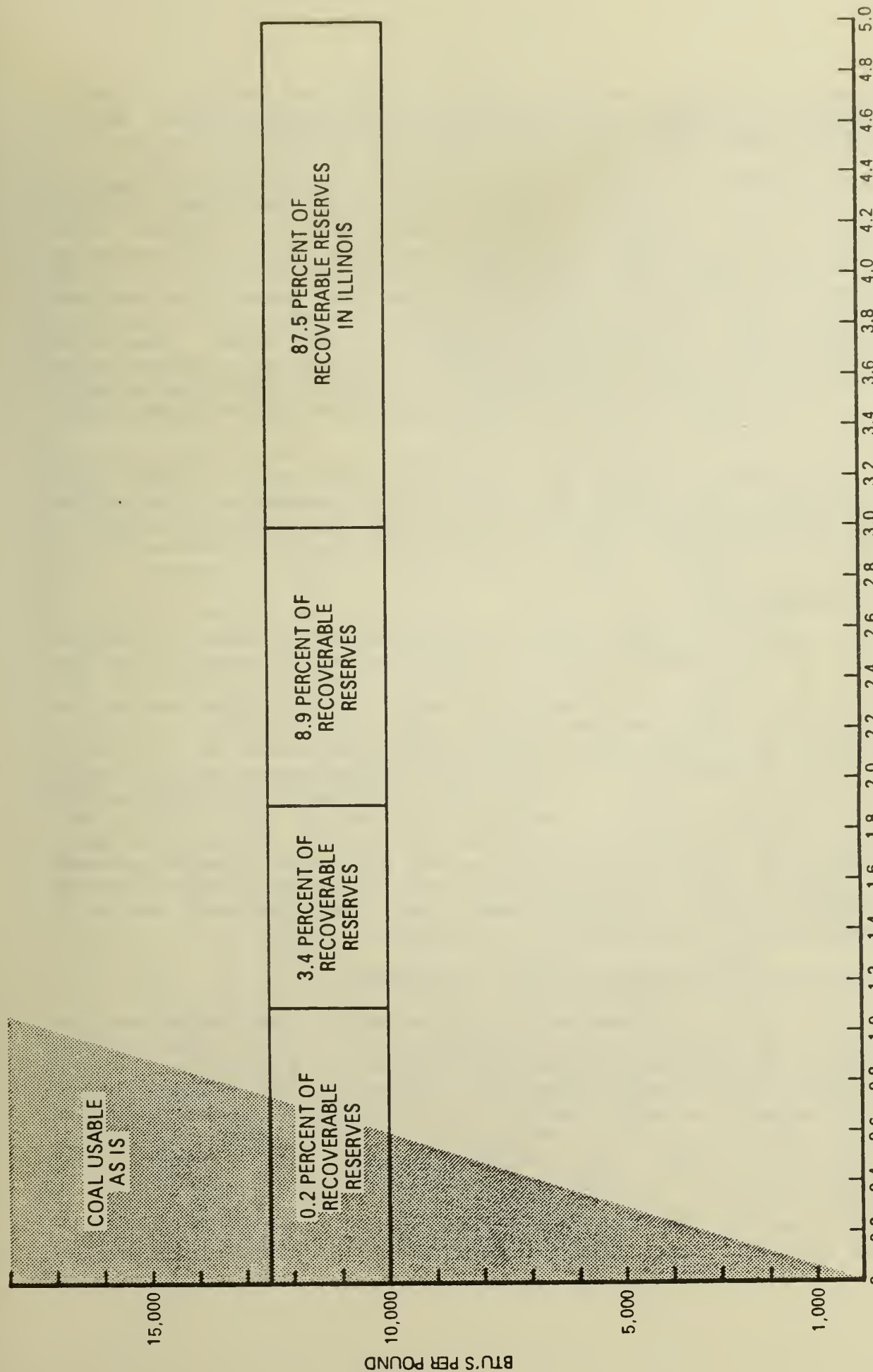


Figure 13

Source: Illinois Department of Transportation

Missouri and Indiana and less likely in Florida and Georgia. Illinois, Missouri and Indiana are three of the five highest sulphur dioxide emitting states and the three largest users of Illinois coal.

The traditional Midwestern users of Illinois coal would be greatly impacted by this legislation because their plants are older facilities without scrubber equipment, unlike the new plants in the Southeast which must meet the existing NSPS scrubber requirement. The IEPA estimates 14.5 million tons of Illinois coal could potentially be lost to low sulphur coal suppliers. According to the IEPA, Baldwin, Kincaid, and Coffeen plants in Illinois are possible candidates for installing scrubbers, due to their close proximity to Illinois mines. Should each of these plants install scrubbers, over 9.5 million tons of the projected 14.5 million ton loss would be saved. In addition, utilities in other states not covered by the NSPS will probably switch to low sulphur coals further decreasing Illinois coal sales.

Illinois does not possess the reserves to meet the low sulphur coal requirements of utilities that do not operate scrubbers. Illinois coal producers must therefore concentrate on utilities with wet scrubbers or industrial uses where sulphur content is not currently a hinderance.

Coal Benefication

Coal benefication or washing is a wet process whereby coal is cleaned in order to lower sulphur and ash content. The coal is washed at the mine prior to shipment. Benefication typically removes 30 percent of the sulphur and nearly 50 percent of the ash. Nationally coal washing has declined as production from Western mines has increased. Currently, Western coal is not washed. In 1978, about 80 percent of the coal in Illinois was washed. As Illinois already has a large amount of its coal washed, there is little likelihood that significant market improvements could be made because of washing alone, and in fact Illinois must continue to wash its coal to maintain its existing markets. Currently, Kentucky and Indiana with similar quality coal as Illinois, do not wash as much of their coal as Illinois. It is possible that if mining companies in these states began washing coal, they could make advances in markets currently served by Illinois mines.

Flue Gas Desulphurization and Other Technologies

Currently the only economically viable method of removing sulphur from coal is by using a flue gas desulphurization (FGD) system, commonly referred to as "scrubbers." In Illinois there are 4 plants that have FGD systems. Costs of these systems vary from 30 cents to \$1.40 per million BTUs, depending on the age and the type of system and the quality of coal being burned. According to investigations by USEPA, costs run 50 percent higher if 5 percent versus one percent sulphur coal is burned. As a result, there is a scrubbing cost disadvantage of 30-40 cents per million BTUs for Illinois coal as compared to low sulphur Western coals. As stated earlier, under the NSPS standard of June 1979 mandating that all new utilities install scrubbers, Illinois coal's advantage could continue

to erode in some market areas. Reliability of wet scrubbers is also an unresolved problem cited by many utilities. A recent survey indicated that scrubbers, when called upon, were 70 percent reliable. The greater the disadvantage is of scrubbing coal, the greater the advantage will become for low sulphur coals.

Other technologies that could enable burning of Illinois coal include fluidized bed combustion, coal gasification, coal thermo-treatment, microwave energy and gravimelt. Fluidized bed combustion is a process where coal and limestone are burned together in a slurry supported by jets of air. The sulphur is immediately absorbed by the limestone and not emitted into the atmosphere. Currently this process is operational at Georgetown University, but is not considered economically feasible relative to conventional scrubbing methods.

While coal gasification is a possibility, problems persist. The sulphur content of coal would still need to be cleaned by scrubbers or other methods. The technology is not economically feasible until petroleum approaches \$50 per barrel. Illinois has the coal and water resources that the process demands. A pilot project at Illinois Power's Wood River Plant is currently underway. Their Kilngas process introduces steam and air converting the sulphur in the coal to a hydrogen sulfide gas. This gas is then removed from the coal by a lime bed. Elemental sulphur can later be removed from the limestone-hydrogen sulfide mixture. The remaining coal gas can be burned without additional pollution control.

Coal thermo-treatment is currently an experimental process whereby coal is heated to 600° F. and slowly charred to remove more water and sulphur. It is then treated with hydrochloric acid decreasing the sulphur content down to about 0.1% content. This treatment of coal is also not economically feasible at this time.

The U. S. Department of Energy has contracted with General Electric and TRW to develop a commercially viable process to chemically clean coal. General Electric's process radiates pulverized coal with microwaves for 40 seconds. This acts to split or rearrange the chemical bonds between sulphur and other elements which liberates sulphur in the form of sulphur dioxide or other compounds. TRW's process called "gravimelt" treats washed coal with molten potassium or sodium hydroxide which extracts sulphur into a molten alkali. The coal mineral content is broken down to compounds soluble in a special fluid. Desulphurized coal floats to the surface of this fluid where it is skimmed off, washed with water and then dried. This process removes 90 percent of the sulphur and mineral matter. Neither the General Electric or TRW "gravimelt" process is economically viable at this time.

The Delivered Price of Coal

The delivered price of coal is comprised of three separate cost factors: cost of coal production, the cost of transportation and taxation. In the Midwest market Illinois has a cost advantage over Western coal in taxation and transportation, but the production cost is considerably higher so that any advantage is virtually eliminated. The cost components of coal delivered from Illinois Basin, Western and Eastern coal mines to Illinois utilities are shown in Table 26.

TABLE 26
COST OF DELIVERED COAL TO ILLINOIS UTILITIES IN 1980
(Per Ton)

<u>Factors</u>	<u>Illinois Coal</u>	<u>Western Coal</u> ^a	<u>Eastern Coal</u> ^b
Transportation cost	\$ 3.42	\$19.01	\$12.78
Taxation	0.99	3.36 ^c	3.33 ^c
Value of coal at the mine	<u>24.85</u>	<u>17.49</u>	<u>37.09</u>
TOTAL DELIVERED COST	\$29.26	\$39.86	\$53.20

^a Western coal is defined as Montana and Wyoming coal.

^b Eastern coal is defined as Eastern Kentucky coal, Illinois' only Eastern coal supplier.

^c A 4 percent Illinois user sales tax on coal produced outside of the state is included in this total.

Source: Coal Outlook, Guide to Coal Contracts, 1983.

Not included in these totals is the cost of sulphur removal. While not a component cost of the delivered price of coal, it nevertheless is an additional cost to utilities. Utilities that are required to scrub Illinois coal pay an additional \$13.00 per ton for capital, operational and maintenance costs of flue gas desulphurization systems. The cost of sulphur removal currently does not impact rural utilities that are required to meet the 6.8 pounds of sulphur dioxide per one million BTU standard. In Illinois, under the New Source Performance standards the total cost of wet scrubbing Illinois coal (includes cost of coal, transportation tax and FGD systems) is about 5 percent less than the total cost of dry scrubbing Western coal. Currently no Western coal burned in Illinois is scrubbed.

Cost of Coal Production

The cost of coal production is influenced by labor productivity, the cost of materials and energy, and capital (depreciation and interest). Labor is the single most important cost factor, accounting for 45 percent of the price of coal at the mine. Labor productivity is dependent on mechanization, size of the mine, and stripping ratio (overburden to coal seam thickness) in strip mines. While Illinois' productivity of 15.1 tons per man-day is higher than the national average of 14.8 tons per man-day, productivity actually fell 7.2 percent per year from 1968 to 1977. While labor productivity in Midwest mines has declined during this time period, it increased in Western mines an average of 7.1 percent per year to a current level of 96.9 tons per man-day.²⁵ Loss in productivity of underground mines during the early 1970s was almost solely due to stricter enforcement of the Coal Mines Health and Safety Act (CMHSA). The single major factor accounting for the productivity decline in Illinois' surface mines is the State Land Conservation and Reclamation Act of 1971.

The remaining 55 percent of production cost is material and energy and capital. These factors are for the most part fixed and mines are less able to change these in order to reduce costs. While the major cost of delivered Illinois coal is labor, the major cost of Western coal is transportation. It will be difficult to improve Illinois coal productivity which is already above the national average, given the type of mining necessary with Illinois coal seams.

Cost of Coal Transportation

Transportation of coal represents a significant portion of the delivered cost of coal. Transportation of Illinois coal can vary from 15 percent to 35 percent of the delivered price whereas transportation of Western coal accounts for 30 percent to 90 percent of delivered price depending on the mode use and the distance hauled.

Illinois coal producers have an integrated transportation system of railroads, barges, trucks and conveyors to deliver coal to end user.²⁶ Most coal in Illinois is moved by rail or rail-barge combination. With Illinois' waterway system, coal producers use barges to move a larger portion of their traffic than the nation as a whole.

²⁵ All Western mines are strip mines that yield more tons per man-day than Illinois' slope or shaft mines. Also many of the Western mines are using newer machinery and are larger in size yielding better economics of a large scale operation.

²⁶ For a more detailed overview of transportation of coal, see Chapter 3. For more detail on issues affecting the transportation system this decade, see Chapter 4.

In 1980, the Staggers Act deregulated many aspects of the railroad industry, thus giving rail carriers greater freedom to set their own rates. A potential increase in rates should marginally improve the demand for Illinois coal over Western coal, since Western coal is more sensitive to transportation costs relative to total delivered price. The extent of the increase in demand may be marginal as utilities pass on higher transportation costs to their consumers.

Illinois' competitive position could change based on changes in rail or barge rates to either Illinois coal producers or other states producing coal. Illinois' advantage is that coal producers here can control a greater portion of the delivered price of coal to users as transportation of Illinois coal is less expensive and represents a smaller percentage of total delivered cost.

Taxation

The State of Illinois currently places a 5 percent occupational sales tax on coal based on the value of gross production and a property tax (ad valorem) based on an evaluation of the property's mineral deposits, mining and processing plants. Illinois' tax is approximately \$.86 per ton of coal. Only Illinois based utilities and industries pay this sales tax.

Purchasers of Western and Eastern coal pay up to \$1 per ton, or in relation to Illinois coal, \$.15-\$.30 per ton more respectively. Montana places a severance tax and property tax on coal production and collects \$1.80 per ton. Wyoming places a 6.5 percent property tax and a 10.5 percent gross production tax yielding \$1.40 per ton of coal produced. East Kentucky coal is taxed at \$.98 per ton based on applicable property taxes and a gross production tax. The State of Illinois also levies a 4 percent users sales tax on out-of-state coal burned within the state. Illinois' tax advantage could be lost should other states, in an effort to promote their coal, lower their taxes.

APPENDIX C: EXPORT MARKETS FOR ILLINOIS COAL

OVERVIEW

- o Even though the United States is projected to supply 30 percent of the coal in the world market by 1990, it is unlikely Illinois will be a major contributor.
- o Massive supplies of low sulphur coal from South Africa, Australia and especially Poland, coupled with the recent worldwide recession, has created a temporary glut of coal on the market that may last into the mid-1980s.
- o The short-term outlook through 1990 for Illinois coal exports appears bleak except for the cement manufacturing industry.
- o The export demand for Illinois coal in the long-term beyond 1990 depends on technological advances, marketing conditions and the cost of coal delivered to foreign ports of entry.

WORLD DEMAND

In 1977, total world demand for coal reached 190 million metric tons of coal equivalents (MCTE).²⁷ Total demand is projected to increase to 275 to 330 million MTCE by 1985 and, 560 to 980 million MTCE by the Year 2000. According to the "World Coal Study" conducted by Massachusetts Institute of Technology the five largest coal importing countries through the Year 2000 will be Japan, France, Italy, West Germany and the Netherlands. Individual countries' import requirements through the end of the century are shown in Table 27.

In 1977, metallurgical coal (coal used in steelmaking) comprised 68 percent of the world import coal market. With the increase in oil prices and the potential for future oil supply problems, the demand for steam coal (coal used for generating electricity and cement or other industrial manufacturing) has grown. By 1985 world steam coal imports are expected to double and by the Year 2000 to surpass metallurgical coal imports.

Each importing country has its own set of specifications for coal used by utilities and manufacturers. The sulphur content in coal typically must be lower than coal that is acceptable for use in the United States. The coal specifications for sulphur content of European and Far Eastern countries are listed in Table 28.

²⁷ Million metric tons of coal equivalents (MTCE) is defined as one million metric tons (2,205 lbs. per metric ton) of coal with a heat content of 12,600 BTU/lb. This is equivalent of 1,157,625 English tons of high BTU (12,000 BTU/lb.) Illinois coal. A BTU or British Thermal Unit is a unit of heat.

TABLE 27

WORLD STEAM AND METALLURGICAL COAL IMPORTS BY COUNTRY
(Millions of Tons of Coal Equivalents)

Country	1977			1985			2000		
	Steam	Metallurgical	Total	Steam	Metallurgical	Total	Steam	Metallurgical	Total
Denmark	4.6	--	4.6	10.7-11.1	--	10.7-11.1	9.4-20.9	--	9.4-20.9
Finland	4.1	0.9	5.0	3.4	1.0	4.4	7.7-12.4	1.0	8.7-13.4
France	14.0	10.0	24.0	11.0-34.0	11.0-12.0	22.0-46.0	26.0-100.0	12.0-15.0	38.0-115.0
West Germany	3.0	1.0	4.0	9.0-11.0	--	9.0-11.0	20.0-40.0	--	20.0-40.0
Italy	2.0	11.1	13.1	10.3-10.9	11.0	21.3-21.9	16.5-45.5	12.0	28.5-57.5
Netherlands	1.5	3.0	4.5	7.0	3.4	10.4	19.9-34.2	2.9-4.0	22.8-38.2
Sweden	0.3	1.8	2.1	2.9-3.2	2.2	5.1-5.4	14.3-23.1	2.8	17.1-25.9
United Kingdom	1.0	1.0	2.0	--	2.0	2.0	15.0	2.0	2.0-17.0
Other Western European	7.0	6.0	13.0	13.0	10.0-13.0	23.0-26.0	32.0-42.0	24.0-32.0	56.0-74.0
Canada	6.0	7.0	13.0	5.0-6.0	5.0-7.0	10.0-13.0	4.0-8.0	5.0-9.0	17.0-9.0
Japan	2.0	60.0	62.0	6.0-7.0	73.0-76.0	79.0-83.0	53.0-121.0	79.0-85.0	132.0-206.0
East & Other Asia	--	3.0	3.0	5.0-24.0	10.0-16.0	15.0-40.0	60.0-179.0	40.0-48.0	100.0-227.0
Africa & Latin America	1.0	7.0	8.0	3.0	20.0	23.0	6.0-10.0	57.0-80.0	63.0-90.0
Centrally Planned Economies ^a	17.0	18.0	35.0	20.0	20.0	40.0	30.0	20.0	50.0
TOTAL WORLD ^b	63.5	129.8	193.3	107.3-152.6	168.6-183.6	274.9-337.2	313.8-681.1	257.7-310.8	556.8-991.9

^a USSR and satellites and China.

^b Totals may not add due to rounding

Source: World Coal Study, Carroll V. Wilson, MIT, Ballinger Publishing Co. PP-107-108.

TABLE 28

COAL IMPORT SPECIFICATIONS FOR UTILITIES
(maximum percent by weight)

<u>Europe</u>	<u>% Sulphur</u>
Norway ^a	1.5
Sweden ^b	0.6-0.8 (maximum)
Finland ^c	-
Denmark ^d	1.5 (1.0 preferred)
West Germany	1.3
Belgium/Luxembourg	2.0 (1.0 preferred)
Netherlands ^e	0.3-1.2
United Kingdom	2.0 (1.5 preferred)
Ireland	2.0 (1.0 preferred)
France	2.0 (0.4-1.5 preferred)
Italy	1.0
Spain ^f	1.0-1.8
Greece	3.0
 <u>Far East</u>	
Japan ^g	1.0
Taiwan	1.5 (air dried)
South Korea ^h	1.0
Hong Kong	-

a 1.0 probable maximum for electricity generation.

b From proposed environmental regulations.

c Finland has relied - almost totally on low-sulphur Polish coal so there has been no need for restrictions.

d At 10,800 to 12,000 BTU/lb. net or 11,300 to 12,600 BTU/lb. gross.

e 1.8% can be used if blending to 1.0% overall is possible.

f 2.5% maximum for industrial use.

g 2.0% maximum acceptable for cement manufacturing.

h 1.5% - 3.0% acceptable for cement manufacturing.

Source: Testimony presented to the Senate Committee on Governmental Affairs Energy Subcommittee, Carbondale, Illinois, June 8, 1981, by Roger W. A. LeGassie, Acting Assistant Secretary for Fossil Energy, U. S. Department of Energy.

The European and East Asian utility market appears virtually closed to high sulphur coals in the near future. Sulphur content of 1.5 percent is a fairly common specification for steam coal although many countries prefer 1.0 percent or less.²⁸ Island Creek Coal Company estimates that 60 percent of the European market will be open to 1.5 percent sulphur coal by 1985.²⁹ According to marketing research by Consolidation Coal Company, only 7 percent of the European market can accept coal containing more than 2 percent sulphur, which will amount to 12 million tons of imports by 1990.³⁰

WORLD SUPPLIERS

As shown in Table 29, six countries exported 224 million MTCE to overseas markets in 1980. The United States led all countries, shipping 75 million MTCE of steam and metallurgical coal or 33 percent of all coal exported. According to the World Coal Study, the U. S. will continue to be the leading exporting country through the Year 2000.

TABLE 29
COAL EXPORTS BY COUNTRY
(Millions of Tons of Coal Equivalents)

<u>Country</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>
United States	75	99	132	221-386
Australia	44	66	99	176-221
South Africa	26	44	66	60-110
Poland	46	55	72	72
Soviet Union	31	39	44	NA
China	2	9	17	NA
TOTAL	224	312	430	529-789

Source: Merrill Lynch, Pierce, Fenner & Smith, Inc., Securities Research Division, The Coal Industry Quarterly Review, August 1980.

World Coal Study, Future Coal Prospects: Country and Regional Assessments (Cambridge, Massachusetts: Ballinger Publishing Company, 1980), pp. 3, 99, 327, 431.

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- 28 Statement by Roger W. A. LeGassie, Acting Assistant Secretary USDOE, p. 250 of Proceedings of the U. S. Senate on high sulphur coal exports.
- 29 Statement by William W. Mason, President Island Creek Coal Co., p. 247 of Proceedings of the U. S. Senate on high sulphur coal exports.
- 30 Statement by Alan Cope, Assistant VP Marketing, Consolidation Coal Co. p. 175 of Proceedings of the U. S. Senate on high sulphur coal exports.

United States Suppliers

During the past 20 years the United States has shipped extensive quantities of metallurgical coal overseas. As late as 1979, U. S. mines shipped 65 million tons to Europe and Asia. Of this tonnage 78 percent was for steel manufacturing. However, during this same year the U. S. began to experience a surge in demand from foreign utilities for U. S. steam coal. By 1981, the total American exports of coal increased to over 110 million tons, of which 45 million tons or 41 percent was steam coal for utilities. This represented a 68 percent increase in steam coal sales to foreign buyers over the previous year. By 1990, the United States is projected to supply 30 percent of all world exports of coal and is expected to rise to 40 percent by the Year 2000.

Despite the major role the United States will play as a coal exporter, Illinois is not one of the states that will be a major contributor. The quality of utility steam coal desired by importing countries is much lower in sulphur than that which Illinois can produce in substantial quantities. The bulk of Illinois' 1980 production consisted of coal with 2 percent sulphur or greater. Nearly 49 million tons, or 78 percent of the coal produced in Illinois was high-sulphur coal. Illinois coal production, stratified by sulphur content, is shown in Table 30.

TABLE 30

ILLINOIS' COAL PRODUCTION BY SULPHUR CONTENT

<u>Coal Tonnage (Millions)</u>	<u>% Sulphur Content</u>
24.9	3.0% or more
23.8	2.0-3.0
5.6	1.5-2.0
<u>8.2</u>	less than 1.5
62.5	

Source: Coal Outlook's Monthly Coal Report for 1981.

There is only a small amount of Illinois coal that is low in sulphur. In 1980, five mines in Illinois produced high BTU low-sulphur coal that could meet the 1.5 percent sulphur specification for steam coal sought by foreign utilities. These mines are shown in Table 31.

TABLE 31

ILLINOIS MINES PRODUCING LOW SULPHUR COAL

<u>Mine</u>	<u>Location</u>	<u>Average BTU/Lb.</u>	<u>Average % Sulphur by Weight</u>	<u>1980 Production (Tons)</u>
Freeman United Orient #6	Jefferson Co.	11,800	1.3	400,111
Inland Steel Co. Mine #1	Jefferson Co.	11,088	1.0	2,006,680
Old Ben Coal Co. Mine #21	Franklin Co.	11,605	1.2	1,329,952
Consolidation Burning Star #5	Jackson Co.	10,600	1.0	2,215,188
Amax Wabash Mine	Wabash Co.	10,492	1.3	1,966,295
Inland Steel Mine #2	Hamilton Co.	11,000	1.0	288,150

Source: Illinois Department of Mines and Minerals and Coal Outlook's
Monthly Coal Report for 1981.

All of these mines have long-term contracts, which would reduce their potential contribution to export markets. Based on their maximum annual production in the last 10 years, these five mines are capable of producing over two million tons of low sulphur coal for foreign markets. The potential contributions to export markets for each mine is summarized in Table 32.

It is not clear whether blending low and high sulphur coals for sale overseas is feasible. Existing boilers are "tuned" to perform best burning the existing low sulphur coals. Blending coals of different ash, volatility, sulphur, and chlorine content may foul these boilers, thereby increasing operating costs. Boilers must be built with blended coals specifications in mind. There must be a long-term commitment on the part of the foreign utilities for them to make adjustments in their plants. There is also limited knowledge and facilities for blending coal. With the current glut of coal, it is doubtful foreign utilities will be willing to incur additional expense in the short-term.³¹

³¹ Statement by Zachariah Allen, Senior Vice President of F. R. Schwab and Associates, p. 314 of "Proceedings of the U. S. Senate on High Sulphur Coal Exports."

Statement by William W. Mason, President of Coal Exporters Association of the U. S., p. 339 of "Proceedings of the U. S. Senate on High Sulphur Exports."

TABLE 32

EXPORT POTENTIAL OF ILLINOIS LOW SULPHUR COAL MINES

<u>Mine</u>	<u>10-Year Peak Production^a</u>	<u>Contractual Obligations</u>	<u>Export Potential</u>
Freeman United Orient #6	1,845,000	1,000,000	845,000
Inland Steel #1	2,588,000	2,000,000	588,000
Amax Wabash Mine	1,248,000	2,200,000	0 b
Consolidation Coal Burning Star #5	2,248,000	2,300,000	0 b
Old Ben Coal #21	2,004,000	1,200,000	804,000
Inland Steel #2	288,000	0 c	<u>288,000</u>
		TOTAL	2,525,000

^a The 10-year peak production is simply the highest production tonnage in a single year during the last 10 years.

^b While contractional obligations are greater than the 10-year peak production, the mining companies still feel that the mine is capable of meeting their contracts.

^c Contractual obligations for Inland #1 and #2 are 2 million tons per year.

Source: Illinois Department of Mines and Minerals and Illinois Department of Transportation.

Illinois coal is not only in competition with foreign coal suppliers but with U. S. suppliers as well. Western and some Eastern American coal producers have extensive quantities of low sulphur coal--the quality coal desired by importing countries. Montana alone has over 113 billion tons of 1 percent sulphur coal reserves while Kentucky and West Virginia combined have more than 20 billion tons.

U. S. low sulphur coal's access to foreign markets via East and West Coast ports is improving. The high demurrage charges once associated with East Coast ports have been virtually eliminated by a guaranteed departure date program initiated by the NW and CSX. Both railroads own and operate large coal docks at Hampton Roads and Baltimore, respectively. The Port of Long Beach near Los Angeles has also undergone extensive capital improvements, which will reduce the delivery time of Western coal to East Asia. Most operational or capital improvements in East or West Coast ports lower the cost of these coals in the market place, thereby creating additional competition for Illinois coal. Illinois coal delivered at New Orleans is comparably priced with other U. S. coals at Eastern or Western ports, but is not of comparable quality.

Foreign Suppliers

Other leading exporting countries are Australia, Poland, South Africa, the Soviet Union and China. In comparison to these leading foreign suppliers, the price of Eastern and Western U. S. coal delivered to Europe in 1979 was 40 to 80 cents higher per ton. As shown on Table 33, South African and Polish coal have a current price advantage in Europe. By the Year 2000, Australia is projected to capture 25 percent of the total European coal market, followed by Poland, South Africa and the United States, each receiving 15-20 percent and Canada with 10 percent. The remaining 5-20 percent will be scattered among other suppliers.

Australia and South Africa have a price advantage in Japan. As shown on Table 33, The price of U. S. coals delivered to Japan was 70 cents per ton higher than its chief competitors.

Poland, South Africa and Australia are selling 1 percent or less sulphur coal with a heat content of 11,000-12,000 BTU per pound. The important characteristics of coal exported by these countries are shown in Table 34. Information on the USSR and China is not available.

1979 STEAM COAL COSTS AND PRICES
(\$ per metric ton)

	Price at Mine	Mine to Port	Price ^a at Port	Port Loading	Ocean Freight	Port Unloading	Delivered Price Range	Avg.	\$/M8TUB ^b
<u>To: NW EUROPE</u>									
<u>From: United States</u>									
East--Underground	20-35	10-15	30-45	1-2	6-10	2	39-59	49	1.85
West--Surface	8-18	10-20	20-35	1-2	8-11	2	31-50	41	2.19
<u>From: Australia</u>									
Underground	15-25	5-10	20-25	2	10-14	2	34-43	39	1.63
Surface	12-20	5-10	18-25	2	10-14	2	32-43	38	1.52
<u>From: South Africa</u>									
Underground	10-15	5-7	15-22	1	8-10	2	26-35	31	1.41
<u>From: Poland</u>									
Underground			23-31	1	5	2	31-39	35	1.46
<u>To: JAPAN</u>									
<u>From: United States</u>									
East--Underground	20-35	10-15	30-45	1-2	11-15	2	44-64	54	2.05
West--Surface	8-18	10-20	20-35	1-2	9-12	1	31-50	40	2.00
<u>From: Australia</u>									
Underground	15-25	5-10	20-25	2	6-8	1	29-36	33	1.38
Surface	12-20	5-10	18-25	2	6-8	1	27-36	32	1.33
<u>From: South Africa</u>									
Underground	10-15	5-7	15-22	1	9	1	26-33	30	1.36
<u>From: Poland</u>									
Underground			23-31	1	11-13	1	36-44	40	1.67

a As mine prices and transport costs are given as ranges, port prices are not necessarily the direct sum of the range limits.

b BTU or British Thermal Units is a unit of heat.

Source: U. S. Department of Energy, Coal Export Study (1979), page 9, Table 4.

TABLE 34
FOREIGN SUPPLIERS OF COAL

<u>Country</u>	<u>Port</u>	<u>Export Coal Characteristics</u>		
		<u>BTU/lb.</u>	<u>Sulphur %</u>	<u>Ash %</u>
Poland	Gdansk	11,200	1.0	13.5
South Africa	Richards Bay	10,800	1.0	16.0
	Maputo	10,700	1.0	18.0
Australia	New Castle	12,000	1.0	14.0
	Port Kombla	12,000	1.0	14.0
United States	Hampton Roads	12,000	1.2	15.0
	Long Beach	9,000	1.0	8.0

Source: Coal Week International, a McGraw-Hill Publication, Aug. 4, 1982, Page 5.

While foreign suppliers offer low sulphur coal at competitive prices, there have been coal supply reliability problems with Australia, Poland and the United States. Australia has had numerous coal mine strikes and Poland has had nationwide labor strikes and major internal unrest. The U. S. has had labor union strikes and quality control problems in exported coal. Some European importers of U. S. coals have not been satisfied with the accuracy of the sampling procedures at U. S. ports, which often yield an inflated BTU content reading. The net result is a desire by importers to diversify sources and minimize the coal supply problems.

While major advances have been made by U. S. exporters, the recent worldwide recession has slowed growth considerably. There is a current glut of low sulphur coal on the market that may not dissolve quickly. Foreign competitors (especially Poland, South Africa and Australia) have stepped up competition further softening prices and creating a buyer's market. According to the National Coal Association, forecasts for short-term growth range from stagnation to 3.7 percent per year--far from the double digit growth in recent years. While short-term projections may not reach anticipated export levels due to the current recession, the underlying advantages of coal over oil will continue.

ILLINOIS EXPORT MARKETS

Export markets for Illinois coal appear to be limited in the short-term. For Illinois to compete in the world steam coal market, Illinois coal must be priced low enough to offset the added costs of installing and operating flue gas desulphurization systems. This is not likely in the 1980s. Future exports of metallurgical coal are also extremely limited as Illinois does not have significant metallurgical coal reserves.

The short-term future for exporting Illinois cement coals appears brighter than that of metallurgical or utility steam coal. Sulphur restrictions for cement coal run lower, generally up to 3 percent maximum content. Higher sulphur content is allowed because the sulphur is absorbed during the cement manufacturing process. In 1981 Illinois shipped 640,000 tons of coal to overseas markets. This was the first year Illinois had sizeable coal exports. Illinois' coal shipments to foreign buyers are shown in Table 35. Most of this tonnage was destined for cement manufacturers in Japan. In 1982, coal exports are likely to range from 500,000 to one million tons.

TABLE 35

ILLINOIS SHIPMENTS OF HIGH SULPHUR COAL

<u>1981</u>		
<u>Country</u>	<u>Quantity</u>	<u>Use</u>
Spain	140,000 tons	Cement
Japan	500,000 tons	Cement

Source: Illinois Department of Transportation.

Illinois coal producers will rely on the cement industry for much of their coal exports in the short-term. According to a marketing study of Illinois Basin coal conducted by the ICG, potential cement export markets are Italy, France, Greece, Portugal and Spain. Few European buyers are interested in long-term contracts, due to market uncertainties, and as a result, are mainly interested in spot market purchases. The European cement market demand for coal is projected in Table 36. By 1985, over 16 million tons will be used to produce cement and is expected to rise to 19 million tons by 1990.

TABLE 36
PROJECTED EUROPEAN CEMENT DEMAND IN 1985 AND 1990
(millions of tons)

	<u>1985</u>	<u>1990</u>
France	3.5	4.0
Greece	2.5	3.0
Italy	4.5	5.0
Portugal	1.5	2.0
Spain	4.5	5.0
	<u>16.5</u>	<u>19.0</u>

Source: Illinois Central Gulf Railroad, The Evolution of the International Coal Trade: A Strategic and Decision-Making Perspective.

There are no published studies on the future of Illinois coal in the East Asian market; however Japan will likely remain an importer of Illinois coal. Cement coal represents a significant market but will probably not exceed 3 to 4 million tons per year in the short-term.³²

The long-term outlook for cement coal will likely continue to be favorable for Illinois coal. While long-term contracts with buyers are currently difficult to secure, the market will likely firm up in the future yielding more favorable conditions. Even so, Illinois will likely contribute 5 to 7 million tons of coal for cement manufacturing by the year 2000.

³² Statement by Subhash Bhagwat, Head Mineral Economics Section, Illinois Geological Survey, pp. 452 & 457 of "Proceedings of the U. S. Senate on High Sulphur Coal Exports."

The long-term growth potential for Illinois utility coal exports is highly dependent on technological advances, existing market conditions, the cost of coal at the port of entry and marketing efforts. There is little reason to believe that European or East Asian countries will increase the acceptable levels of sulphur dioxide, so Illinois coal producers must rely on technological advances to stimulate steam coal sales overseas. These technologies, as outlined in Appendix B, include flue gas desulphurization systems and fluidized bed combustion. As these technologies are perfected and become commercially viable, operational costs should decrease. Illinois coal, however, will become competitive only when the delivered cost of Illinois coal and the purchase and operational costs of these technologies are equal or are less expensive than the low sulphur coal alternative.³³

³³ Statement by George Erwin, V. P. of Zinder-Neris Consulting, p. 269 of "Proceedings of the U. S. Senate on High Sulphur Coal Exports."

APPENDIX D: COAL TRANSPORTATION SYSTEMS IN ILLINOIS

OVERVIEW

Railroads and barges are the primary modes used to transport coal that either originates or terminates in Illinois. Trucks and conveyor-to-plant operations are used to supply a few key Illinois utilities. The major characteristics of the transportation of coal for Illinois are summarized as follows:

- o In 1980, railroads transported 57 percent of all coal originating or terminating in Illinois, rail-barge combinations transported 25 percent, trucks transported 6 percent, conveyor-to-plant transported 11 percent and conveyor-to-barge transported one percent.
- o Based on existing long-term contracts between mining companies and utilities, the modal distribution is not expected to change during the 1980s.
- o Railroad unit trains provide an economical means of transporting coal from Illinois mines to Midwestern destinations and are currently the only economical means of transporting Western coal into Illinois.
- o Rail-barge combinations are key for transporting coal from Illinois mines to Midwestern and Southeastern markets.
- o Trucks are primarily used for short-haul coal movements within Illinois or the bordering states of Indiana, Kentucky and Missouri. Trucks provide for 100 percent of the coal requirements of utility plants in Springfield, Grand Tower, Oakwood, Hutsonville and Marion.
- o Conveyor systems are currently used for mine-to-utility operations at Kincaid, Baldwin and Coffeen. However, by the mid-eighties, the Coffeen plant may begin receiving coal via truck for an interim two-year period, then via railroad for the long-term future.

MODAL DISTRIBUTION OF COAL TRAFFIC IN ILLINOIS

In 1980, railroads hauled more coal than all other modes combined. Approximately 78 percent of Illinois-produced coal was moved by railroads alone or in combination with barges. Railroads and rail-barge combinations also carried nearly 90 percent of non-Illinois coal delivered to Illinois utilities.

Each mode of transportation is important to certain coal markets. As shown in Table 37, railroads and rail-barge are the primary modes used for distributing Illinois coal outside of Illinois and railroads are the only economical means of transporting Western coal into Illinois. Rail-barge is used to distribute Illinois coal to Midwestern and Southeastern markets and to distribute Western coal to Illinois destinations once it is in the state. Trucks are primarily used for transporting Illinois coal within the state.

Taking a closer look at the markets for Illinois coal, as shown in Table 38, conveyor-to-plant comprises the largest mode used to transport Illinois coal within the State, followed by railroads and trucks. Railroads are key to reaching Midwestern states of Illinois, Missouri, Indiana, Wisconsin and Minnesota. Rail-barge or truck-barge are the only modes used to reach Georgia and Florida and carry significant amounts of Illinois coal to the market states of Missouri, Wisconsin and Iowa.

TABLE 37

1980 COAL TRAFFIC WITHIN ILLINOIS^a (Thousands of Tons)

<u>Mode</u>	<u>Coal Destined for IL by Source</u>				<u>Total Coal</u>	<u>% Total</u>
	<u>IL Coal Destined Out-of-State</u>	<u>Illinois</u>	<u>WY,MT,CO</u>	<u>KY,IN</u>		
Railroad	25,172	6,900	10,652	62	42,786	57%
Rail-Barge	13,128	814	3,500	1,400	18,842	25%
Truck	90	3,032	0	406	3,528	5%
Truck-Barge	778	0	0	65	843	1%
Conveyor-Plant	0	8,015	0	0	8,015	11%
Barge	<u>1,080^b</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,080</u>	<u>1%</u>
Total	40,248	18,761	14,152	1,933	75,094	100%

^a Overhead traffic moving through Illinois is not included.

^b Conveyor from mine to dock.

Source: Illinois Department of Transportation survey.

TABLE 38

1980 MARKET DISTRIBUTION OF ILLINOIS COAL BY MODE
(Thousands of Tons)

<u>Destination</u>	<u>Railroad</u>	<u>Rail-Barge</u>	<u>Truck</u>	<u>Truck - Barge</u>	<u>Conveyor- Plant</u>	<u>Conveyor- Barge</u>	<u>Total</u>
Illinois	6,900	814	3,032	0	8,015	0	18,761
Missouri	10,069	2,079	30	0	0	0	12,178
Indiana	10,662	0	0	0	0	0	10,662
Wisconsin	2,570	1,048	0	0	0	0	3,618
Georgia	0	4,980	0	0	0	0	4,980
Iowa	951	799	60	0	0	0	1,810
Florida	0	500	0	500	0	967	1,967 ^a
Minnesota	696	465	0	0	0	0	1,161
Michigan	98	215	0	0	0	0	313
Alabama	0	0	0	156	0	0	156
Kentucky	126	0	0	0	0	0	126
Tennessee	0	0	0	122	0	0	122
Mississippi	0	0	0	0	0	113	113
Unspecified ^b	0	3,042	0	0	0	0	3,042
TOTAL	32,072	13,942	3,122	778	8,015	1,080	59,009

^a Anticipated growth in the Florida market is expected to reach 5.3 million tons/year by 1985; the coal would be transported via rail-barge.

^b Tonnage reported as moving from mine to Mississippi or Kaskaskia River docks via railroad for unknown destinations.

Source: Illinois Department of Transportation survey.

The outlook for 1990 is for coal production and traffic within the state to remain at approximately the 1980 levels. For Illinois-produced coal, total 1990 traffic was assumed to be 62.5 million tons. As shown in Table 39, the modal shares of the traffic distribution for coal under long-term contracts in 1990 was assumed to approximate the percentage distribution for total traffic. Based on these assumptions, small tonnage increases in railroad, rail-barge and truck-barge traffic were projected with a decrease in conveyor-to-plant traffic. Truck and conveyor-to-barge traffic were projected to remain at the 1980 traffic levels.

A projection for total coal traffic within Illinois is shown in Table 40. Small decreases were projected in out-of-state coal destined for Illinois utilities, since coal currently under long-term contract will meet projected utility coal requirements and long-term contracts for 1990 deliveries are slightly lower than those for 1980. For Western coal, the traffic identified under long-term contracts for 1990 was assumed to be the total 1990 traffic, representing a decrease from the 1980 traffic. For coal produced in Kentucky or Indiana, the majority of the traffic consisted of spot market purchases or contracts that terminate prior to 1990. For this coal, it was projected that all of the coal under contract would be delivered, and that about three-fourths of the 1980 non-contract coal traffic level would continue through 1990.

TABLE 39

COMPARISON OF 1980 ILLINOIS COAL TRAFFIC TO 1990 PROJECTED TRAFFIC
(Thousands of Tons)

Mode	1980 Long-Term Contracts		1980 Total Traffic		1990 Long-Term Contracts		1990 Projected Total Traffic	
	Tons	% Total	Tons	% Total	Tons	% Total	Tons	% Total
Railroad	21,225	50%	32,072	54%	32,035	56%	35,200	56%
Rail-Barge	10,438	24%	13,942	24%	14,590	25%	15,775	25%
Truck	1,616	4%	3,122	6%	2,355	4%	3,125	5%
Truck-Barge	500	1%	778	1%	985	2%	1,100	2%
Conveyor-Plant	8,015	19%	8,015	13%	6,000	10%	6,000	10%
Conveyor-Barge	967	3%	1,080	2%	1,300	2%	1,300	2%
TOTAL	42,761	100%	59,009 ^a	100%	57,265	100%	62,500 ^b	100%

^a IDOT study identified 59,009 thousand tons, which represents 95 percent of the 62,542 thousand tons produced in 1980.

^b Assumes demand will recover to the 1980 production level.

Source: Illinois Department of Transportation.

TABLE 40

PROJECTED 1990 COAL TRAFFIC WITHIN ILLINOIS
(Thousands of Tons)

<u>Mode</u>	<u>IL Produced Coal</u>	<u>Western Coal Destined for IL</u>	<u>KY, IN Coal Destined for IL</u>	<u>Total Coal Traffic</u>	<u>% Total</u>
Railroad	35,200	8,650 ^b	0	43,850	58%
Rail-Barge	15,775	3,000 ^b	1,000	19,775	26%
Truck	3,125	0	325 ^c	3,450	5%
Truck-Barge	1,100	0	0	1,100	1%
Conveyor-Plant	6,000	0	0	6,000	8%
Barge	<u>1,300</u>	<u>0</u>	<u>0</u>	<u>1,300</u>	<u>2%</u>
TOTAL	62,500 ^a	11,650	1,325	75,475	100%

^a Assumes demand will recover to the 1980 level.

^b Long-term contract tonnage was used to represent total tonnage, based on the assumption that most Western coal is purchased under long-term contract now and since Illinois utilities have most of their projected coal requirements under long-term contract, no new contracts will be negotiated.

^c Long-term contract tonnage was used to represent total tonnage for similar reasons as described in footnote (b).

Source: Illinois Department of Transportation.

RAILROADS

Overview

In 1980 railroads transported 60.7 million tons of coal within Illinois. Of this total traffic, 45.8 million tons was produced by Illinois mines and 14.9 million tons was produced at non-Illinois mines and transported to Illinois. The 1980 coal tonnage carried by each railroad is shown in Table 41.

The three major coal carriers in Illinois are the Missouri Pacific (MP), the Illinois Central Gulf (ICG) and the Burlington Northern (BN). Each railroad carried over 10 million tons of coal in 1980 and together these railroads transported 76 percent of Illinois coal picked up at the mines. The majority of MP's and ICG's coal traffic was Illinois coal and over one-half of BN's coal traffic was produced at Illinois mines.

The Chicago & Northwestern (CNW), Southern Railway (SOU) and Conrail also carried significant tonnages of Illinois coal of at least 2.7 million tons/year each. The Louisville Nashville Railroad (LN) carried 800 thousand tons of Indiana coal into Illinois. The other eight railroads listed on Table 41 carried the remaining 9 percent of Illinois-produced coal. These eight railroads do not pick up coal at the mines, but receive traffic from other railroads. The railroad system with coal traffic densities for 1980 and 1990 are shown on Figures 14 and 15.

Taking a statewide perspective on coal movement, there are 2,280 miles of rail lines that carry over one million tons of coal each year. These coal lines represent 23 percent of the total railroad system in Illinois. A statewide comparison of coal traffic based on miles of rail line carrying a certain coal traffic density in comparison to the total traffic is shown on Table 42. In 1980, 4,035 miles of rail lines carried coal in Illinois. The majority of these lines (3,135 miles) carried less than 3 million gross tons-miles per mile of coal per year and most of the coal traffic was carried over high-density rail lines.³⁴

Coal traffic destined for Illinois is not expected to increase during the 1980s. Illinois utilities have projected growth in use of nuclear power by the mid-eighties and no growth in coal use. Based on the Department of Transportation's analysis of Illinois coal markets, increases in coal traffic within the state would be a result of out-of-state purchases, primarily by utilities in Missouri, Indiana and Florida. These increases were projected on the basis of existing long-term contracts between Illinois mining companies and utilities. The railroad coal traffic under long-term contract for delivery in 1980 and 1990 is shown on Table 43. Assuming that no major increase will occur in the total level of coal traffic, more coal transported by railroad will be purchased under long-term contract for 1990 than in 1980.

³⁴ High-density rail lines are defined as those with an annual traffic density of over 5 million gross ton-miles/mile. As a general rule, heavy density lines function as main lines.

TABLE 41

1980 COAL TRAFFIC BY RAILROAD^a
(Thousands of Tons)

Railroad	Illinois Coal		Non-Illinois Coal		Total Originated Traffic ^b	Total Coal By Carrier ^b
	Tons Picked up at Mine	Tons Rec'd. from Other RRs	Tons Picked up at Mine	Tons Rec'd. from Other RRs		
Missouri Pacific	18,800	500	0	800	18,800	20,100
Illinois Central Gulf	11,400	0	0	3,700	11,400	15,100
Burlington Northern	4,800	2,400	6,700	0	11,500	13,900
Chicago Northwestern	2,900	1,500	0	4,900	2,900	9,300
Chi. & Ill. Midland	0	200	0	6,900	0	7,100
Southern Railway	2,700	8,100	0	0	2,700	10,800
Conrail	3,200	0	0	0	3,200	3,200
Peabody	2,000	0	0	0	2,000	2,000
Illinois Terminal	0	0	0	800	0	800
Chicago So. Shore	0	2,100	0	0	0	2,100
Santa Fe	0	700	0	700	0	1,400
Toledo, Peoria & Western	0	0	0	1,300	0	1,300
Louisville & Nashville	0	0	800	0	800	800
Milwaukee Road	0	200	0	0	0	200
Belt Railway Co.	0	200	0	0	0	200
Elgin, Joliet & Eastern	0	200	0	0	0	200
Soo Line	0	100	0	0	0	100
Union Pacific	0	0	5,900	0	5,900	5,900
Denver & Rio Grande	0	0	1,500	0	1,500	1,500
TOTAL	45,800	16,200	14,900	19,100	60,700	NAC

a This traffic does not represent the total traffic carried by railroads in 1980, since only major coal movements were surveyed, single-car and multi-car shipments were not included. For example, the total ICG traffic originated at Illinois mines was 12 million tons, whereas the survey recorded only 11.4 million.

b Overhead traffic to Illinois is not included.

c Not applicable. The traffic totalled by carrier includes the total tonnage carried for all types of movements. A sum of the totals for individual carriers would double count interline movements, which are included for each participating railroad.

Source: Illinois Department of Transportation Survey.

Figure 14

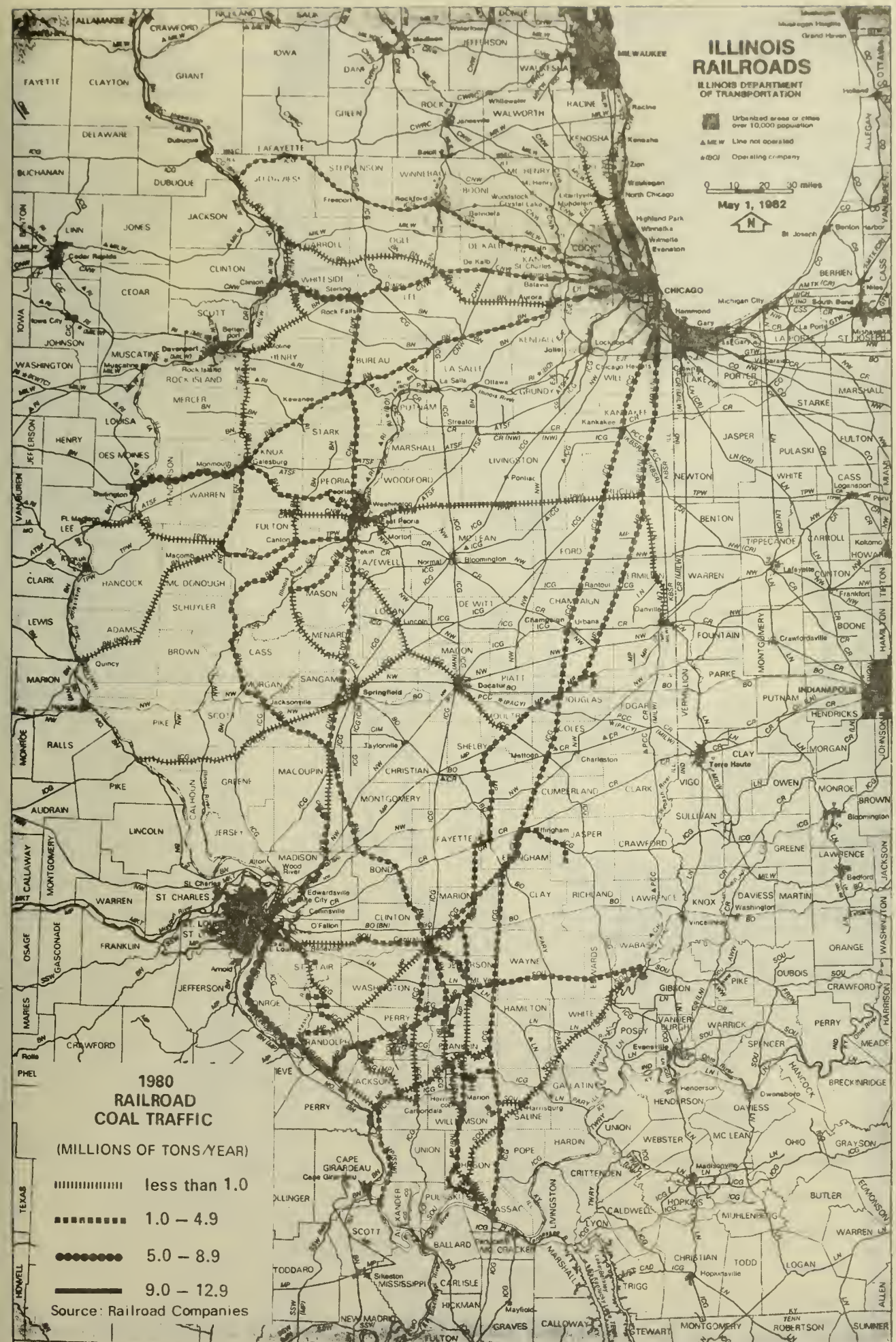


Figure 15

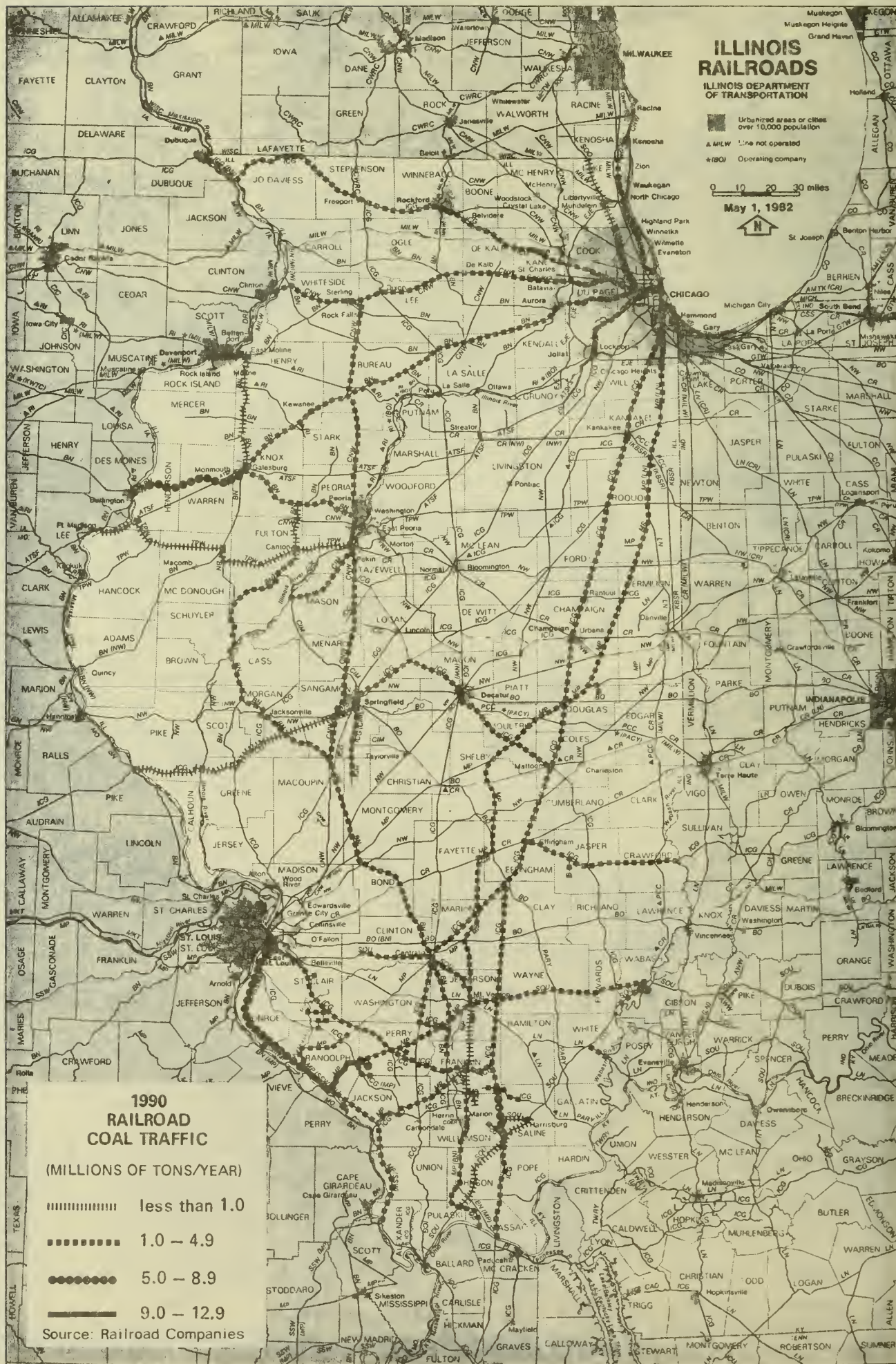


TABLE 42

ILLINOIS RAILROAD MILEAGE BY ANNUAL COAL TRAFFIC AND TOTAL LINE TRAFFIC^a
(Miles)

Annual Coal Traffic (Millions of Tons)	Total Annual Rail Line Traffic (Millions of Tons)						Total
	25	10 to 25	5 to 10	3 to 5	1 to 3	1	
9 to 11	3	16	--	--	--	--	19 mi.
7 to 9	9	2	--	--	--	--	11 mi.
5 to 7	220	17	13	--	--	--	250 mi.
3 to 5	332	241	34	12	--	--	619 mi.
1 to 3	361	724	42	81	180	--	1,388 mi.
1	275	446	244	261	241	281	1,748 mi.

Total Mileage
for Line Carrying
Coal in Illinois

1,200 mi. 1,446 mi. 333 mi. 354 mi. 421 mi. 281 mi. 4,035 mi.

^a 1980 Traffic.

Source: Illinois Department of Transportation survey and Railroads in Illinois.

TABLE 43
RAILROAD COAL TRAFFIC 1980 AND 1990
(Thousands of Tons)

<u>1980 Long-Term Contract</u>	<u>Mode of Transportation</u>		<u>Total</u>
	<u>Railroad</u>	<u>Rail-Barge</u>	
Illinois Coal ^a	21,225	10,438	31,663
Western Coal ^b	10,602	3,500	14,102
KY/IN Coal	0	700	700
Total	<u>31,827</u>	<u>14,638</u>	<u>46,465</u>
<u>Actual 1980 Traffic</u>			
Illinois Coal ^a	32,072	13,692	45,764
Western Coal ^b	10,652	3,500	14,152
KY/IN Coal	62	1,400	1,462
Total	<u>42,786</u>	<u>18,592</u>	<u>61,378</u>
<u>1990 Long-Term Contract</u>			
Illinois Coal ^a	32,035	14,590	46,625
Western Coal ^b	8,650	3,000	11,650
KY/IN Coal	0	0	0
Total	<u>40,685</u>	<u>17,590</u>	<u>58,275</u>
<u>Projected 1990 Traffic</u>			
Illinois Coal	35,200	15,975	51,175
Western Coal	8,650	3,000	11,650
KY/IN Coal	0	0	0
Total	<u>43,850</u>	<u>18,975</u>	<u>62,825</u>

^a Illinois coal destined for markets within and outside Illinois.

^b Western coal from Montana, Wyoming and Colorado.

The railroad system in Illinois appears to be capable of handling current coal traffic. Based on a review of the legal weight limits on Illinois rail lines carrying over one million tons of coal per year, the system has no restrictions to 100-ton hopper cars, which are usually used for unit-train operations. Looking to the future, no system problems were identified and railroad companies have plans for maintaining coal routes and addressing needed line improvements. No major problems are anticipated on railroad coal lines through 1990.

For the purpose of this analysis, coal traffic was categorized as either Illinois-produced coal destined for market or out-of-state coal destined for Illinois. The following sections of the report present more detail on these categories of coal traffic for 1980 and 1990.

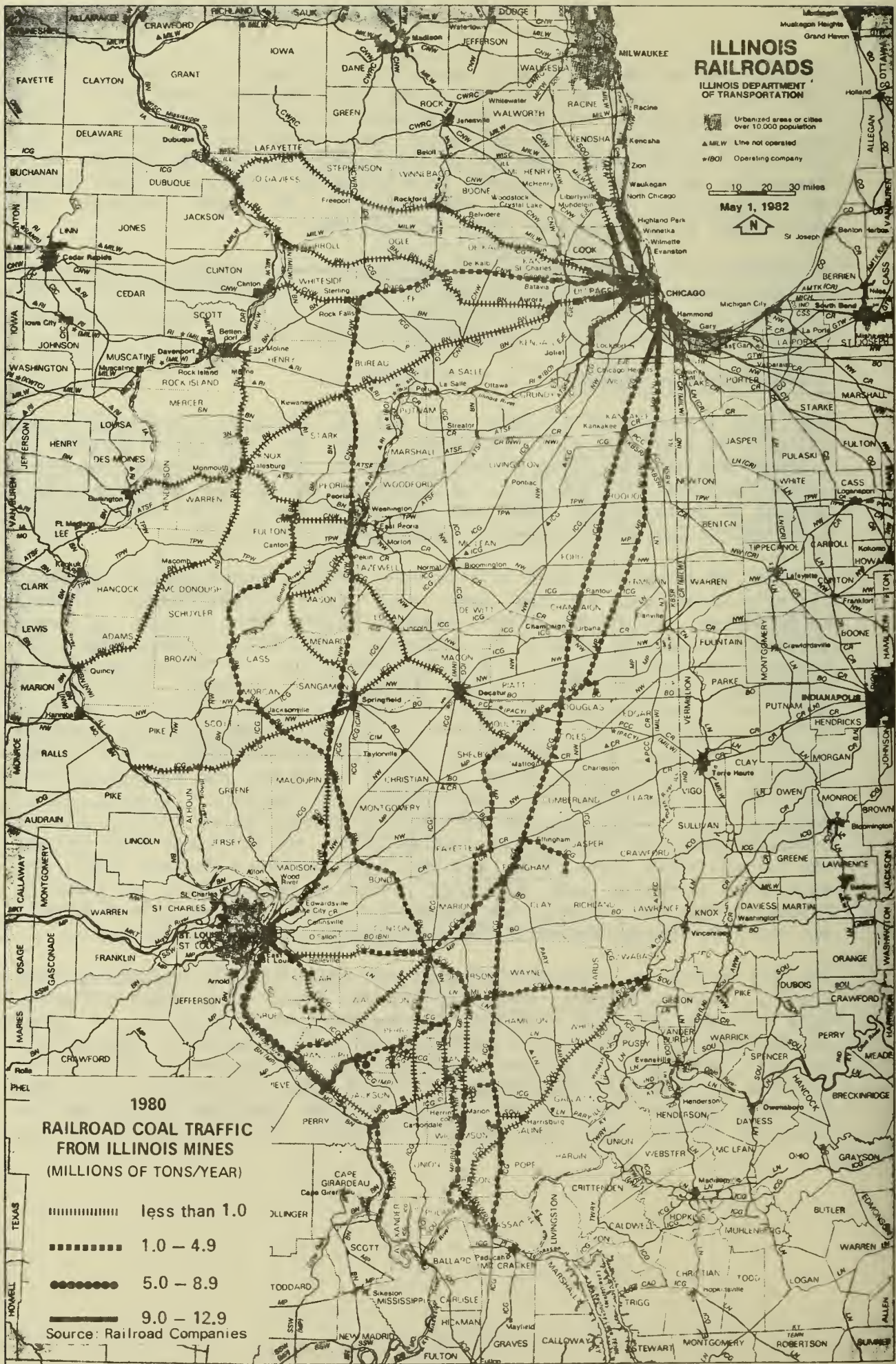
Illinois Coal to Market

The major carriers of Illinois coal are the Missouri Pacific (MP) and Illinois Central Gulf (ICG) Railroads. These two carriers originated 30 million tons of coal from Illinois mines in 1980. The other important common carriers of Illinois coal are the Burlington Northern (BN), Chicago & Northwestern (CNW) and Southern/Conrail. The 1980 railroad distribution system for Illinois coal is shown on Figure 16.

In 1980, MP originated 18.8 million tons of coal from mines in Southern Illinois--over one million tons each from Southwestern, Freeman, Consolidated, Amax, and Orient mines. Nearly all of this coal was destined to points outside of Illinois. The MP provides access for Illinois coal to utilities in Missouri (47 percent of MP coal traffic), Indiana (12 percent) and Illinois (8 percent). In 1980, one-third of MP's traffic was transported south to the Mississippi River to docks at Kellogg, Cora and Ford. With the development of the coal trans-loading facility at Cora, which opened in 1980, this rail-barge traffic should continue to increase. As shown on Figure 3, MP has the highest density coal lines in the state in Randolph County in Southern Illinois. Other major MP coal routes are the mainline to Chicago where traffic can be exchanged with the Belt Railway Company (BRC), the Milwaukee Road (MILW), the Chicago South Shore (CSS), and the Elgin, Joliet & Eastern (ESE); the main line to Kansas City that also serves Union Electric in Labadie, Missouri; the line through the southern tip of Illinois into Missouri; and the line through Marion to Joppa, Illinois.

The ICG picked up 11.4 million tons of coal in 1980, primarily from Peabody, Sahara, Freeman, Amax, and Old Ben mines in Southern Illinois. Most of the ICG coal traffic is destined for utilities or steel manufacturers in Illinois (30 percent), Indiana (21 percent), Georgia (21 percent), Minnesota (8 percent) and Wisconsin (6 percent). For traffic destined to Wisconsin, Minnesota or Indiana, the ICG connects with CNW, BN, MILW, BRC and Soo Line in Chicago. Another important connection for Southern Illinois coal destined for Minnesota in 1980 was in Peoria,

Figure 16



where the ICG exchanged traffic with the CNW. However, since 1980, the ICG routes that traffic either via Chicago or Pekin. The ICG also has access to the South and Southeast via its Chicago-New Orleans mainline, which serves docks on the Tennessee River and New Orleans. The high-density ICG coal routes in 1980 are the mainline through Chicago-Effingham-Centralia, a line off this mainline to Newton, the line from the Peabody mine in St. Clair County to the East St. Louis dock and the line in Randolph County to the Baldwin Power Station.

Other major carriers of Illinois coal are the BN, CNW and Southern/Conrail. In 1980, the BN carried 7.2 million tons of Illinois coal, which represents over one-half of BN's total coal traffic in Illinois. BN picked up 4.8 million tons of Illinois coal at the mines; 38 percent of this coal was destined for Illinois, primarily from mines in Fulton County, and 25 percent went to Missouri, primarily from mines in Franklin County. BN also carried 2.4 million tons to Missouri utilities as interline movements with the MP.

In 1980 the CNW carried 4.4 million tons of Illinois coal, representing almost half of its coal traffic in the state. The CNW picked up 2.9 million tons from mines south of Springfield or in the Peoria area and carried 2.2 million tons north to utilities primarily in Wisconsin and Indiana and 0.7 million tons south to the East St. Louis dock on the Mississippi River. The CNW also provided access to Wisconsin and Minnesota for 1.5 million tons of coal from Saline and Franklin Counties via interline movements with the BN through Virden or the ICG through Peoria or Chicago.

The Southern Railway (SOU) and Conrail are major coal carriers in Southeastern Illinois. In 1980, the Southern carried 2.7 million tons of coal from the Monterey mine west of Centralia to Carol, Indiana. Since 1980, SOU purchased trackage from Keensburg to Cairo from Conrail. In 1980, coal traffic on this line was 500 thousand tons from Sahara mines near Harrisburg to Joppa Electric Energy. The SOU now provides this service. By retaining trackage rights over the SOU from Keensburg to Carol, Indiana, Conrail continues to transport about 2.2 million tons of coal from the Amax Wabash mine to Carol, Indiana.

Peabody Coal Company operates a short-line railroad in conjunction with truck and a conveyor system for the transportation of coal from their mines in St. Clair and Randolph Counties to the Kaskaskia River or to the Baldwin Power Plant. In 1980, Peabody moved 3 million tons to Baldwin Power and 2 million to the Kaskaskia destined to Missouri utilities. In addition to this traffic, Peabody, in conjunction with the ICG, annually moves about one-half to one million tons to the Kaskaskia River; of which 250 thousand tons is ultimately destined for Wisconsin.

Future Illinois Coal Movement (1985-90)

For the 1985-90 period, traffic is expected to maintain current levels. Annual coal traffic densities for coal under long-term contract in 1990 are shown on Figure 17. With the opening of the Mapco mine in White County, shipments to Florida will increase. The mine has a 1.2 million ton/year contract with Seminole Electric in Florida. The coal will be transported via the LN to a dock in Mt. Vernon, Indiana on the Ohio River, then via barge to Pride, Alabama, where the traffic will be transloaded to Southern for delivery to the plant. MP traffic to Mississippi River ports is expected to increase, particularly through Cora. The ICG has a contract with Hoosier Power for the movement of 1.3 million tons of coal from Freeman United's Crown III mine. The ICG is also planning service options for the Galatia mine.

Out-of-State Coal to Illinois Utilities

Most of the out-of-state coal moving via rail to Illinois utilities comes from mines in Wyoming and Montana. The major consumer of Western coal is Commonwealth Edison. In 1980, Commonwealth Edison received 13.2 million tons and for 1985 is expected to receive only 12 million tons.³⁵ The main routes used to move coal to the Commonwealth Edison plants are:

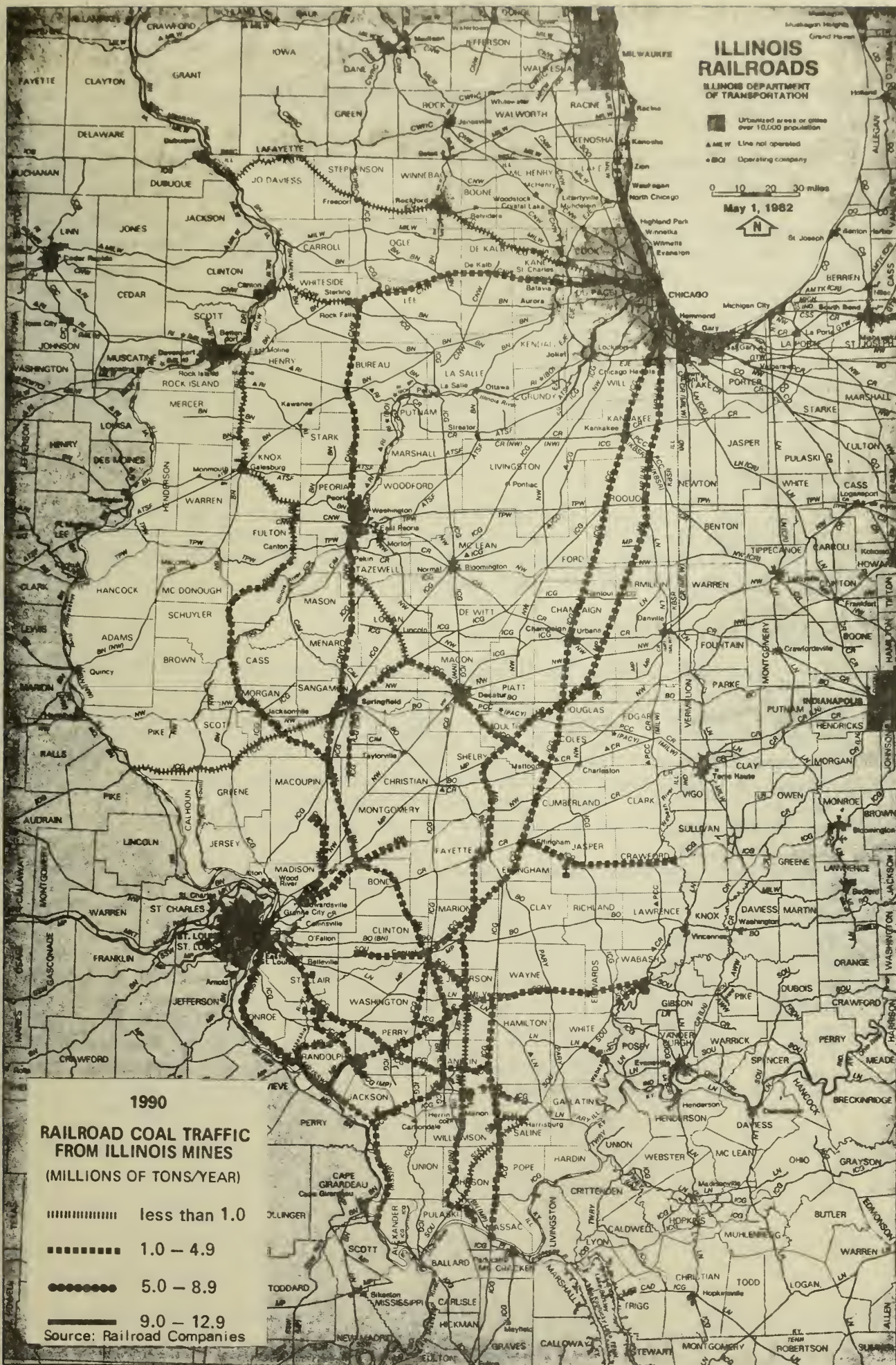
- o BN from Wyoming and Montana to Peoria via Burlington, IA and Galesburg, then the CIM to the Havana dock, then barge up the Illinois River to the plants in Will County and Chicago.
- o BN from Wyoming to Chicago, then ICG to the Joliet plant.
- o Union Pacific Railroad (UP) from Wyoming to Council Bluffs, where the traffic is interchanged with CNW, which takes it to Peoria where it is interchanged with the Chicago and Illinois Midland (CIM), which delivers it to the Havana dock for shipment up the Illinois River to the plants in Chicago and Will County.
- o UP from Wyoming to Council Bluffs, where the traffic is interchanged with the CNW, which takes it to Peoria where the CIM picks it up and delivers it to the Powerton plant in Pekin.

Central Illinois Light Company (CILCO) purchases Western coal for its Edwards plant in Bartonville. The primary routing for this traffic is:

- o Denver & Rio Grande Western Railroad (DRGW) from a Colorado mine to interchange with the Santa Fe (ATSF) in Pueblo, CO; ATSF takes the traffic to Ft. Madison, IA, where it is picked up by the Toledo, Peoria & Western (TPW), which delivers it to the plant.

³⁵ Commonwealth Edison reached an out-of-court settlement to delay some shipments of Western coal until the late 1980s.

Figure 17



Illinois Power Company(IP) also purchases Western coal for its Wood River plant. The routing for this traffic is:

- o DRGW from a Colorado mine to Pueblo, CO; MP from Pueblo to East St. Louis; then IT for delivery to the plant.

The 1980 and the 1990 annual coal traffic densities for these routes are shown on Figures 18 and 19. A comparison of these figures indicates that these current routes will remain important for coal traffic through 1990.

Three routes used in 1980 were not identified for 1990. The BN-TPW traffic to the CILCO plant in Bartonville was part of a contract which terminates in 1983. The contract for the DRGW-MP-IT traffic to the IP plant in Wood River expires after 1985. Traffic over these two routes may continue. The LN-TPW traffic from an Indiana mine to the CILCO plant in Bartonville was a spot market purchase not expected to continue.

Export Coal Routes

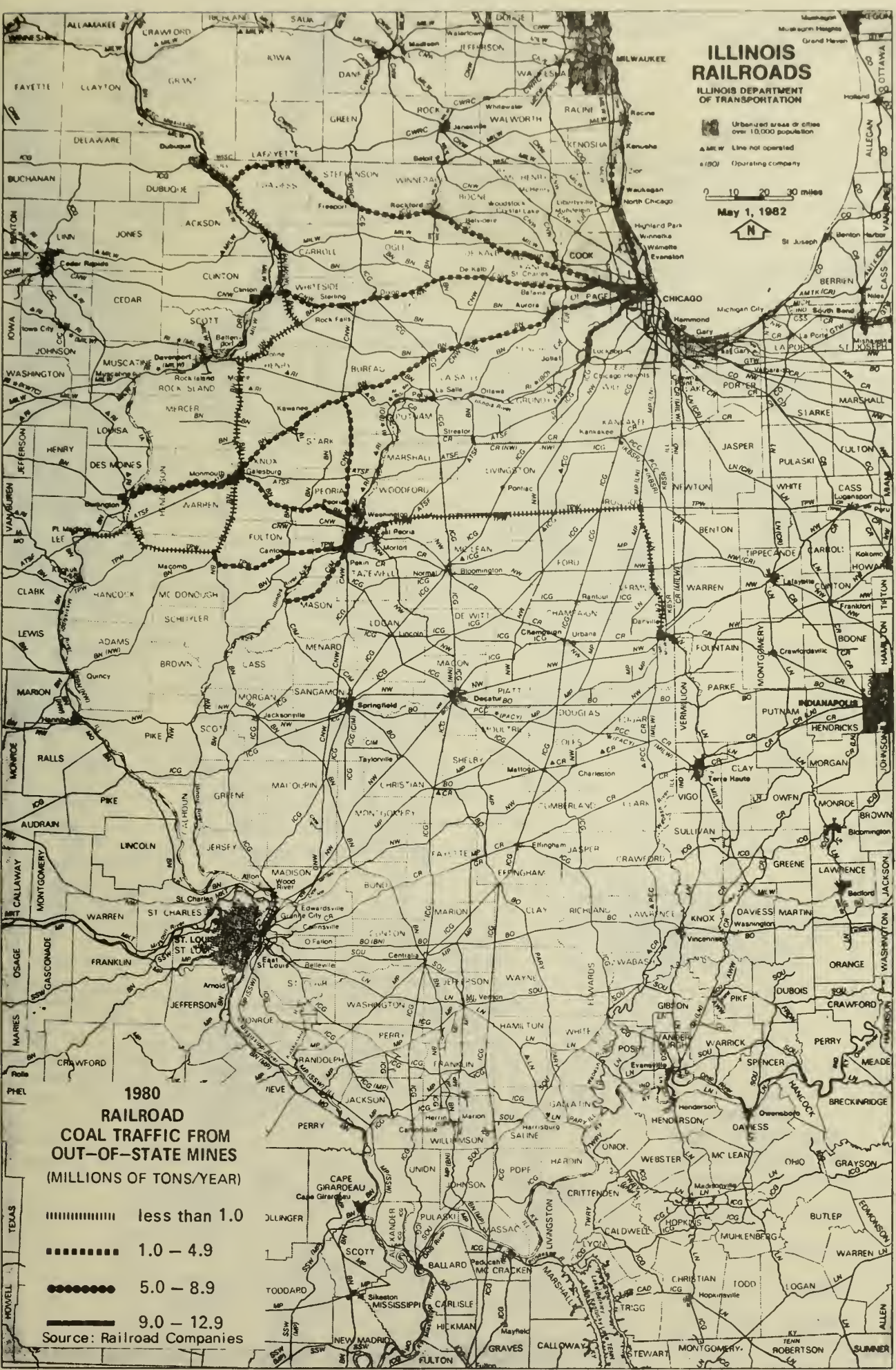
1981 was the first year for any Illinois coal exports. The traffic was routed either via the MP to Mississippi River docks then via barge to the Gulf or via ICG or MP straight to the Gulf. By 1985 the MP and ICG each expect to carry one million tons annually.

Coal Traffic on Light-Density Lines

Most of the coal traffic in Illinois is on high-density rail lines with a total traffic density of over 5 million gross/ton-miles per mile (GTM/M). However, 4,033 miles of light-density lines, representing 23 percent of Illinois' rail system, carry coal. Since the Department of Transportation participates in the federal Local Rail Service Assistance Program for light-density lines, a closer evaluation was made of these light-density lines. The light-density lines in Illinois with the 1980 coal traffic are listed on Table 44 and are shown on Figure 20.

As coal distribution patterns change over the rail system due to new utility coal contracts or termination of contracts and spot market purchase, the light-density lines carrying coal will change. Using the 1980 light-density line system, a comparison was made between this system and lines that are projected to carry coal under contract in 1990. The 1980 light-density lines over which coal traffic is projected for 1990 are shown on Figure 21. The additional coal carrying light-density lines for 1990 are portions of the recently upgraded ICG line in Central Illinois, over which the 1.3 million tons of coal from the Freeman Crown III mine south of Springfield is projected to be transported to Hoosier Power in Merom, Indiana.

Figure 18



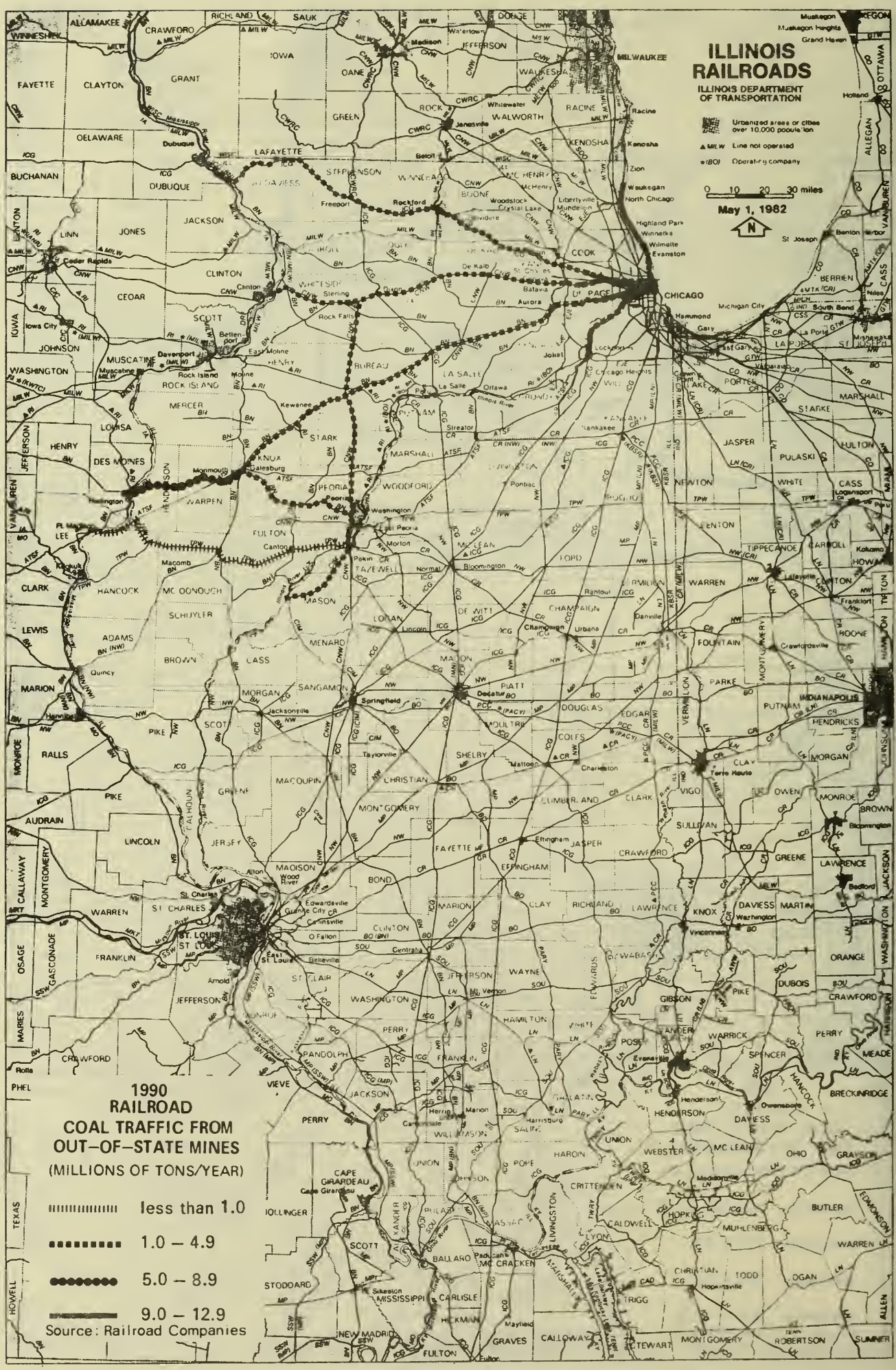


TABLE 44

1980 LIGHT-DENSITY COAL LINES
(Millions of Tons)

<u>Railroad</u>	<u>Line</u>	<u>1980 Coal Tons</u>	<u>Miles</u>
BN	Yates City-Dunfermline	0.48	19.8
	Dunfermline-Vermont	1.04	27.6
	Sesser-Old Ben #26	1.9	3.0
	Old Ben #21-Old Ben #21 Jct.		1.0
CIM	Havana-Barr	0.17	35.6
CNW	Middle Grove-Elm	0.23	10.0
	Elm-Molitor Jct.	0.73	13.7
	Monterey Jct.-Monterey #1	2.19	5.2
ICG	Baldwin-Percy	1.30	18.5
	Percy-Leahy	2.73	3.8
	Leahy-Carbondale	0.06	23.4
	North Yard-Carbon Lake	0.29	8.6
	Gorham-Grand Tower	0.23	5.9
	Pinckneyville-Pyatts	1.12	5.2
	Pyatts-Fidelity #11	1.12	2.8
	Benton Jct.-Akin Jct.	0.01	10.3
	Christopher-Zeigler	0.27	4.3
	Effingham-Newton Plant Jct.	1.37	23.5
MP	Villa Grove-Zeigler Jct.	1.41	3.9
	ICG Jct.-Fidelity #11 Jct.	0.15	34.7
	Fidelity #11 Jct.-Spartan #2	0.33	0.6
	Spartan #2-Burning Star #3 Jct.	0.57	7.5
	Burning Star #3 Jct.-Gage Jct.	1.85	17.0
	JSW Jct.-Mt. Vernon Jct.	1.87	2.9
	JSW Jct.-Scheller	2.01	10.6
	Scheller-Shake Rag	2.43	15.7
	Shake Rag-Pinckneyville	3.47	2.7
	Benton Jct.-Orient 4	0.67	10.7

TABLE 44 (Cont'd)

<u>Railroad</u>	<u>Line</u>	1980 <u>Coal Tons</u>	<u>Miles</u>
MP (Cont'd)	Orient 4 Jct.-Nielsen Jct.	0.60	15.1
	Vienna Jct.-Joppa Jct.	0.60	7.9
	Joppa Jct.-Joppa	0.89	
	Orient #4 Jct.-Zeigler #4 Jct.	0.88	1.8
	Zeigler #4 Jct.-Zeigler #4	0.12	1.0
	Zeigler #4 Jct.-Orient #4	0.76	3.2
<hr/>			
TPW	Mapleton-Iowa Jct.	1.23	3.9
	Mapleton-Canton	1.23	17.0
	Canton-Bushnell	1.23	31.4
	Bushnell-La Harpe	0.71	24.6
	Lomax-La Harpe	0.71	10.5
<hr/>			
SOU	Mt. Carmel-Keensburg	2.68	3.7
	Keensburg-Harrisburg	0.48	56.1
	Harrisburg-Karnak	0.53	46.0
	Saline Branch	0.88	10.7

Source: Railroad Companies.

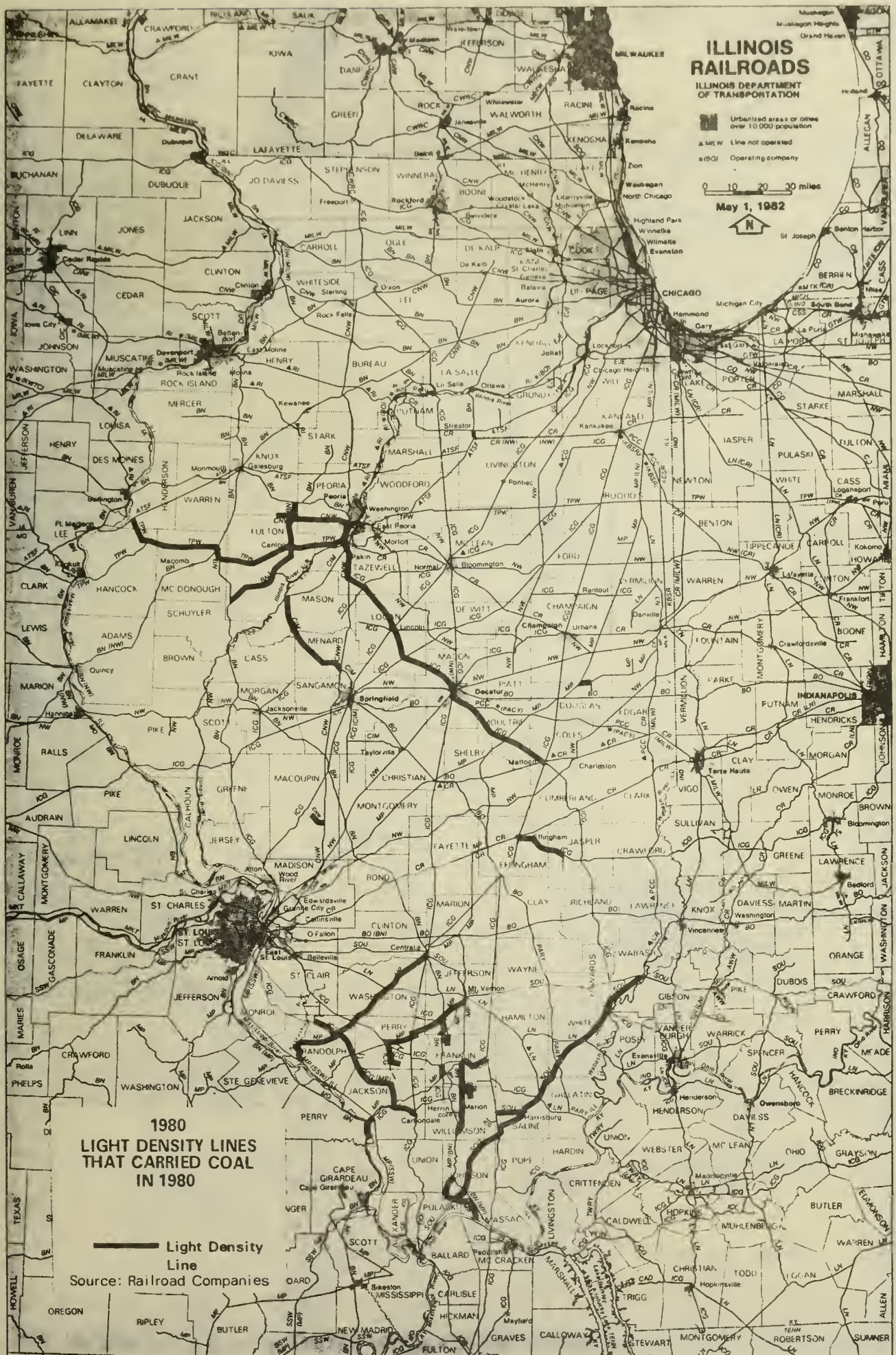
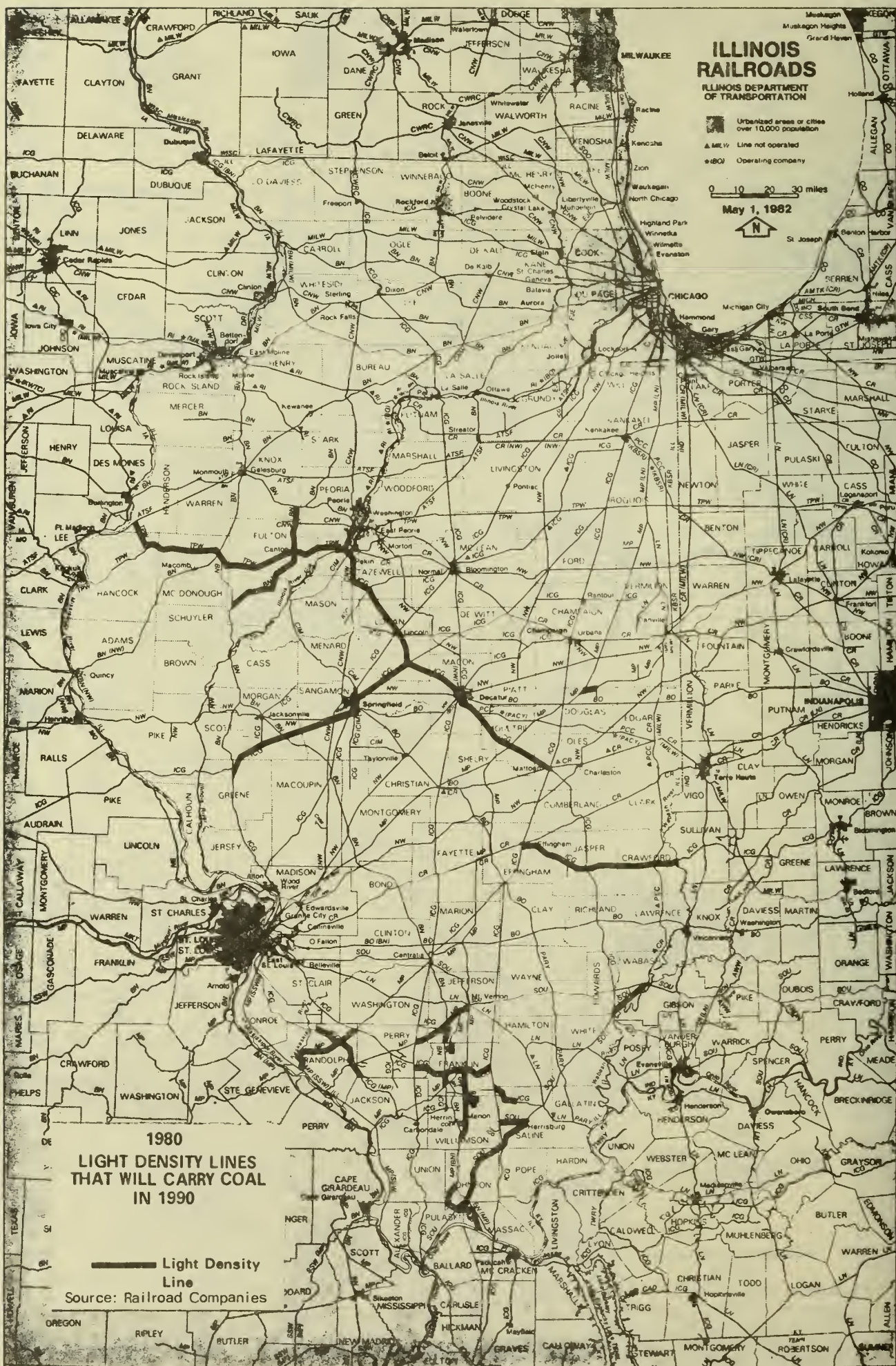


Figure 21



Although no coal contracts were identified, coal traffic may move over lines which historically have carried coal. The 1980 light-density lines which may carry coal during the 1985-90 period are:

- o The Southern Railroad's Cairo Branch near Harrisburg;
- o The ICG line to the Baldwin Power plant in Southwestern Illinois;
- o The MP line through Centralia;
- o The CNW line from the Midland Rapatee mine in Fulton County to Peoria.

PORTS

Illinois coal mines located in Southern Illinois and the Illinois utilities located on the inland waterway are able to take advantage of relatively low-cost barge transportation. Approximately 29 percent of all coal originating or terminating in Illinois is shipped via the inland waterway, predominantly as rail-barge.

In 1980, barges carried approximately 27 million tons of coal over the inland waterway system serving Illinois terminals. As shown on Table 45, 15.8 million tons was Illinois coal moving to market, 3.5 million was Western coal moving to Illinois utilities, 2 million tons was Kentucky and Indiana coal moving to Illinois, and 5.2 million was overhead traffic moving through Illinois.

TABLE 45
1980 COAL TRAFFIC THROUGH ILLINOIS PORTS
(Thousands of Tons)

<u>Source of Coal</u>	<u>Through Traffic</u>	<u>Shipped from Illinois</u>	<u>Received in Illinois</u>
Illinois	0	15,800	814 ^a
WY, MT, UT	3,450	3,500	3,500 ^a
KY, IN	<u>1,700</u>	<u>0</u>	<u>2,008</u>
TOTAL	5,150	19,300	6,322

^a This tonnage was also shipped from other Illinois ports.

Source: Illinois Department of Transportation.

Illinois terminals have the capacity to handle more coal traffic than is currently handled. As shown in Table 46, many ports were operating below practical capacity in 1980. For Cora, which opened in 1980, shipments have been increasing as the port becomes established; contracts with utilities for 1985 total 3.2 million tons. A reduction in demand for Illinois coal in the Great Lakes region due to its high sulphur content resulted in shipment of around 2 million tons/year through Chicago ports in 1980.³⁶

³⁶ 900,000 tons of coke was also shipped through Rail to Water Transfer Corporation in 1980.

TABLE 46

MAJOR ILLINOIS COAL-LOADING TERMINALS ON THE INLAND WATERWAY SYSTEM
(Thousands of Tons)

<u>Coal Terminal</u>	<u>1980 Coal Traffic</u>	<u>Maximum Annual Capacity^a</u>	<u>Storage Capacity</u>	<u>Landside Transportation</u>
Rail to Water Transfer Corp. Chicago, IL	2,815 ^b	10,000	500	BRC, Truck
Havana Coal Transfer Plant Havana, IL	3,500	6,240	140	CIM, Truck
Frederick Dock Frederick, IL	514	550	0	BN, Truck
Peabody Coal Company East St. Louis, IL	2,006	5,000	0	TRRA
Kellogg Coal Dock Sparta, IL	3,153	4,500	550	MP
Ford Dock, Inc. Ford, IL	2,741	3,500	0	MP
Cora Coal Transfer Terminal Cora, IL	183 ^c	15,000	1,000	MP
Kaskaskia Regional Port District Dock #1, New Athens, IL	2,650	10,000	0	Peabody Coal Railroad
Peabody Coal Company Shawneetown, IL	1,080	5,500	200	Conveyor
Shawneetown Regional Port District Terminal Shawneetown, IL	122	1,000 ^e	1,000	Truck

TABLE 46 (Cont'd.)

MAJOR ILLINOIS COAL-LOADING TERMINALS ON THE INLAND WATERWAY SYSTEM
(Thousands of tons)

<u>Coal Terminal</u>	<u>1980 Coal Traffic</u>	<u>Maximum Annual Capacity^a</u>	<u>Storage Capacity</u>	<u>Landside Transportation</u>
Barter Enterprise Shetlerville, IL	0	6,000	--	Truck
Downen Bros. Transportation Shetlerville, IL	656	2,000	1,000	Truck
Cook Coal Terminal Metropolis, IL	5,930	12,000	1,000	BN, MP, Truck

a Individual operators of barge loading facilities calculate maximum annual capacity using different factors (e.g., different hours of operation each day or for days of operation) depending on the unique situation of each operation. For terminals for which the operators did not specify a maximum annual capacity as part of the survey, it was calculated as 12 hours/day operation of the barge loading equipment for a 250-day year.

b Includes 900 thousand tons of coke.

c Cora opened in 1980; tonnage reflects a partial year's operation. 3.2 million tons were identified for 1990 utility contracts.

d Peabody Coal operates the railroad at the Port District.

e Shawneetown Regional Port District uses Peabody Coal Company's dock at Shawneetown.

Source: Illinois Department of Transportation, based on telephone interviews with selected terminals.

Coal traffic under long-term contract with utilities for 1980 and 1990 is shown on Table 47. The decrease in Western coal to Illinois utilities represents Commonwealth Edison's projected lower shipments under existing contracts. This coal is loaded on barge at Havana and shipped to plants in the Chicago area. The 700 thousand tons received by Joppa Electric Energy is not under contract in 1990. A more detailed look at barge traffic through Illinois ports is presented on Table 48.

TABLE 47
BARGE COAL TRAFFIC 1980 AND 1990
(Thousands of Tons)

<u>Tonnage Shipped</u>	<u>IL Coal</u>	<u>Western Coal</u>	<u>KY/IN Coal</u>	<u>Total Coal</u>
1980 Contracts	11,875 ^a	3,500 ^c	0	15,375
1980 Actual	15,800 ^a	3,500 ^c	0	19,300
1990 Contracts	13,175 ^b	3,000 ^c	0	16,175
1990 Projected	14,475 ^b	3,000 ^c	0	17,475
<u>Tonnage Received</u>				
1980 Contracts	814	3,500	700	5,014
1980 Actual	814	3,500	1,465	5,779
1990 Contracts	1,500	3,000	0	4,500
1990 Projected	1,500	3,000	1,000	5,500
<u>Overhead Traffic</u>				
1980	NA	3,450	1,700	5,150
1990	NA	3,500	1,700	5,000

^a Includes tonnage also received (814 thousand tons) by Illinois utilities that receive coal via barge.

^b Not included is Illinois coal traffic moved via non-Illinois terminals: 1,200 thousand tons to Florida via Mt. Vernon, IN, and 2,500 thousand tons to Georgia via Grand Rivers, KY. Includes traffic also received by Illinois utilities (1,500 thousand tons).

^c This traffic was both shipped and received by Illinois ports. It was transported to Havana via unit train, transloaded to barge, and shipped to utilities in the Chicago area.

TABLE 48

COAL TRAFFIC THROUGH ILLINOIS PORTS 1980 AND 1990^a
(Thousands of Tons)

Terminal	Origin(Mine)	Destination (Utility)	Tonnage Shipped		Tonnage Received	
			1980	1990	1980	1990
Chicago(Lake M.) ^b	Southern IL	Michigan	215	0	0	0
Chicago(Com. Ed.)	WY, MT	Chicago	0	0	3,500*	3,000*
Hennepin	Southern IL	Hennepin	0	0	300*	300*
Hennepin	KY	Hennepin	0	0	193	0
Havana	WY, MT	Chicago	3,500*	3,000*	0	0
Havana	KY	Havana	0	0	507	0
Frederick	Central IL	Meredosia	514*	0	0	0
Meredosia	Central IL	Meredosia	0	0	514*	0
FlorenceC	Southern IL	Florence	0	0	0	1,200*
Pearl	IN	Pearl	0	0	65	0
E. St. Louis	Central IL	Unknown	726	0	0	0
E. St. Louis	Southern IL	Unknown	890	0	0	0
E. St. Louis	Southern IL	Iowa	75	0	0	0
E. St. Louis	Southern IL	Minnesota	315*	0	0	0
Kellogg	Southern IL	Hennepin	300*	300*	0	0
Kellogg	Southern IL	Iowa	522*	1,440*	0	0
Kellogg	Southern IL	Iowa	202	0	0	0
Kellogg	Southern IL	Wisconsin	798*	0	0	0
Kellogg	Southern IL	Florida	500*	1,375*	0	0
Kellogg	Southern IL	Unknown	831	0	0	0
New Athens ^c	Southern IL	Florence	0	1,200*	0	0
New Athens	Southern IL	Missouri	2,000*	2,000*	0	0
New Athens	Southern IL	Wisconsin	250*	0	0	0
New Athens	Southern IL	Minnesota	150*	0	0	0
New Athens	Southern IL	Unknown	250	0	0	0
Ford Dock	Southern IL	Georgia	2,500*	2,500*	0	0
Ford Dock	Southern IL	Unknown	241	0	0	0
Cora	Southern IL	Missouri	79*	1,200*	0	0
Cora	Southern IL	Florida	0	765*	0	0
Cora	Southern IL	Unknown	104	0	0	0

TABLE 48 (Cont'd.)

COAL TRAFFIC THROUGH ILLINOIS PORTS 1980 AND 1990^a
(Thousands of Tons)

<u>Terminal</u>	<u>Origin(Mine)</u>	<u>Destination (Utility)</u>	<u>Tonnage Shipped</u>		<u>Tonnage Received</u>	
			<u>1980</u>	<u>1990</u>	<u>1980</u>	<u>1990</u>
Joppa	KY	Joppa	0	0	700*	0
Metropolis ^d	Southern IL	Georgia	2,480*	0	0	0
Shawneetown(Peabody)	Southern IL	Mississippi	113	0	0	0
Shawneetown(Peabody)	Southern IL	Florida	967*	1,300*	0	0
Shawneetown	Southern IL	Tennessee	122	0	0	0
Quincy	Central IL	Iowa	0	485*	0	0
Shetlerville	Southern IL	Florida	500*	500*	0	0
Shetlerville	Southern IL	Alabama	156	0	0	0
TOTAL			19,300	13,175	5,779	4,500

*1980 traffic under long-term contract; all 1990 traffic was considered under long-term contract.

- a Not included in Table is 1.2 million tons from Southern IL that will be shipped to Florida via the LN to Mt. Vernon, IN, then barge to plant in 1990.
- b 1980 overhead traffic not included: 600 thousand tons of Kentucky coal was shipped to Wisconsin via the ICG from Kentucky to Chicago, then barge to the plant. Also an additional 1.1 million tons was moved through the Port of Chicago from origins and/or destinations not identified by the survey and 900 thousand tons of coke was moved through the port to Great Lakes destinations.
- c The 1.2 million tons projected for 1990 may be delayed. After the data for this report was developed, Soyland Power Company, the recipient of this shipment, announced that construction plans for a new plant in Florence would be delayed indefinitely.
- d 1980 overhead traffic not included: 3.45 million tons of coal from Wyoming and Utah was shipped to Indiana and Ohio via BN to Cook Terminal then barge to the plants. Also, the 2.48 million tons listed on the table was a temporary move in 1980, which now is transported via Grand Rivers, Kentucky.

Source: Illinois Department of Transportation survey.

1980 Coal Traffic

Looking at the 1980 coal traffic, shown on Figure 22, the highest density link in the system was between Metropolis and the confluence of the Ohio and Tennessee Rivers. Traffic over this link flows east and south from Metropolis to Indiana and Georgia, south from Shawneetown to the Gulf and west from Indiana to Joppa. The coal shipped via the Kaskaskia River and the Mississippi River ports at Kellogg, Ford and Cora is primarily shipped from Southern Illinois mines to utilities in Central Illinois, Iowa, Minnesota, Wisconsin and Florida. 1980 traffic through the Port of Chicago was destined for points on the Great Lakes. Also shown on Figure 9, traffic was heavier on the upper portion of the Illinois River north of Havana due to the Western coal movement to Commonwealth Edison.

Most of the coal shipped through Illinois ports is received from railroads. In 1980, 13.9 million tons of Illinois coal was shipped to market via railroad-barge, 1.1 million tons was shipped via conveyor-barge and 800 thousand tons via truck-barge. The 1980 rail-barge movements are shown on Figure 23. Kellogg, Ford and Cora are served by the MP. New Athens on the Kaskaskia is served by the ICG and the Peabody Railroads. The ICG also serves ports at East St. Louis and Metropolis. The ICG and the MP carry coal from Southern Illinois mines to Chicago where they interchange with the BRC, that serves the Port of Chicago. The BN carries Western coal to Peoria where it is interchanged with the CIM, that serves the port at Havana. The Peabody Coal Company has a mine to dock conveyor system serving Shawneetown.

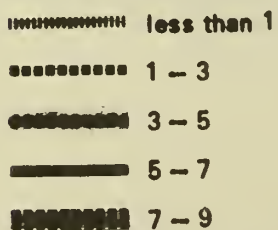
1990 Outlook for Coal Traffic

The coal currently under long-term contract in 1990 is shown on Figure 24. Based on existing long-term contracts, the Kaskaskia River and Mississippi River from East St. Louis to the Ohio River will carry 5-7 million tons/year in 1990. The actual 1990 traffic is expected to be higher since spot market purchases and coal annually received by utilities from the same sources or different under short-term contracts are not included on the map.

Annual railroad-barge traffic for 1990, as shown on Figure 25, will continue to be heavy. The movement of Western coal via the BN and the CIM to Havana will continue to be between 1-3 million tons/year. ICG traffic to E. St. Louis and to New Athens will also maintain current traffic levels of 1-3 million tons/year. Increases in traffic can be expected for MP traffic to Kellogg, Ford and Cora. The 1990 traffic, represented on Figure 24, is a conservative estimate based on contracts. A review of the MP's 1980 traffic to the Mississippi River docks indicates that 20 percent or 2.8 million tons was taken to the docks with the ultimate receiver unidentified by this study. Therefore, the traffic volume to those docks shown on Figure 24 is expected to be higher if historical traffic patterns continue.

Figure 22

**1966 BARGE COAL TRAFFIC
(MILLIONS OF TONS/YEAR)**



Source: Port Operators and Utility Companies



Figure 23

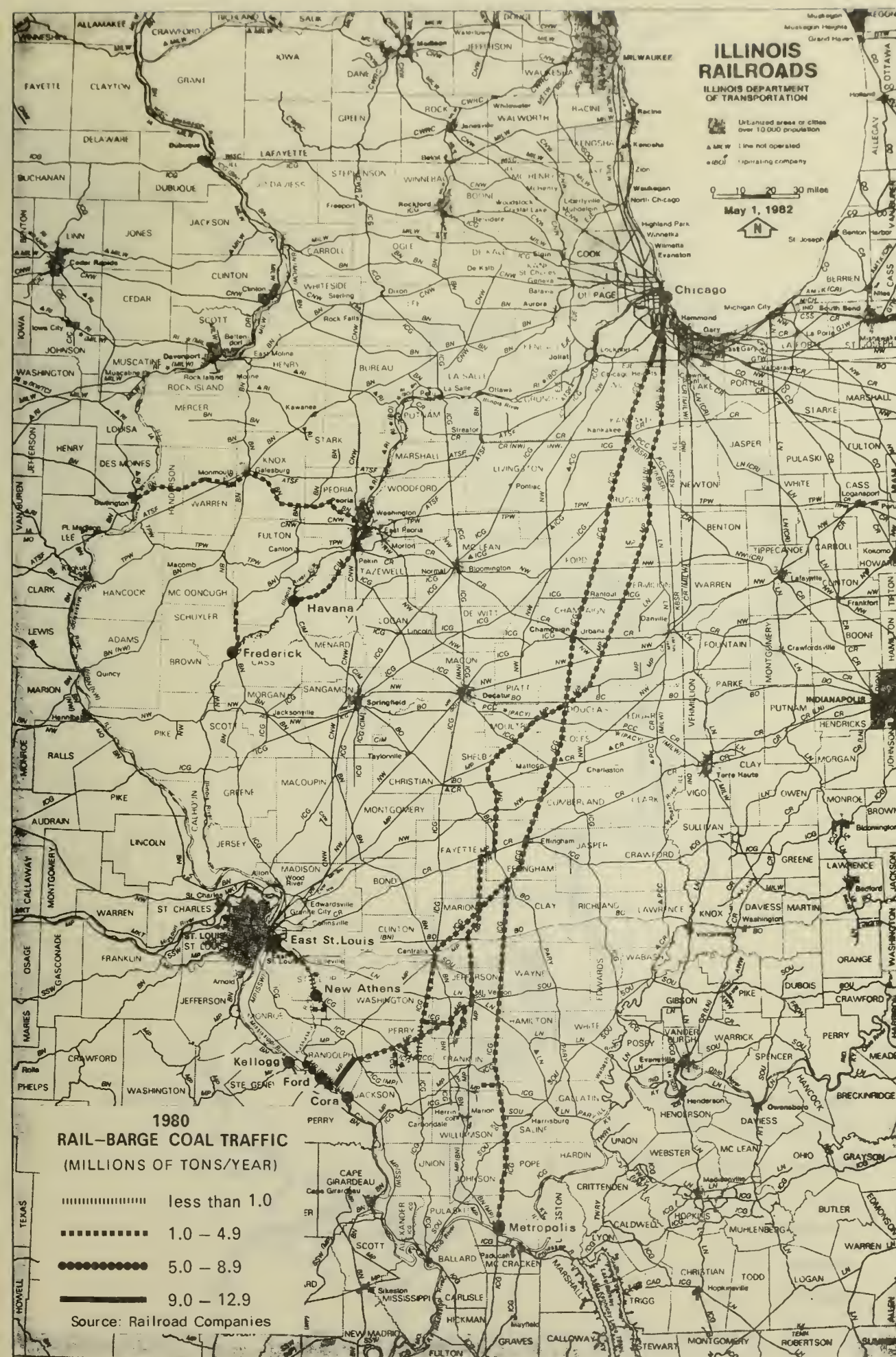
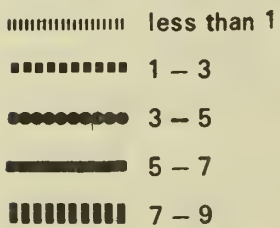


Figure 24

1990 BARGE COAL TRAFFIC

(MILLIONS OF TONS/YEAR)



ILLINOIS
RAILROADSILLINOIS DEPARTMENT
OF TRANSPORTATION

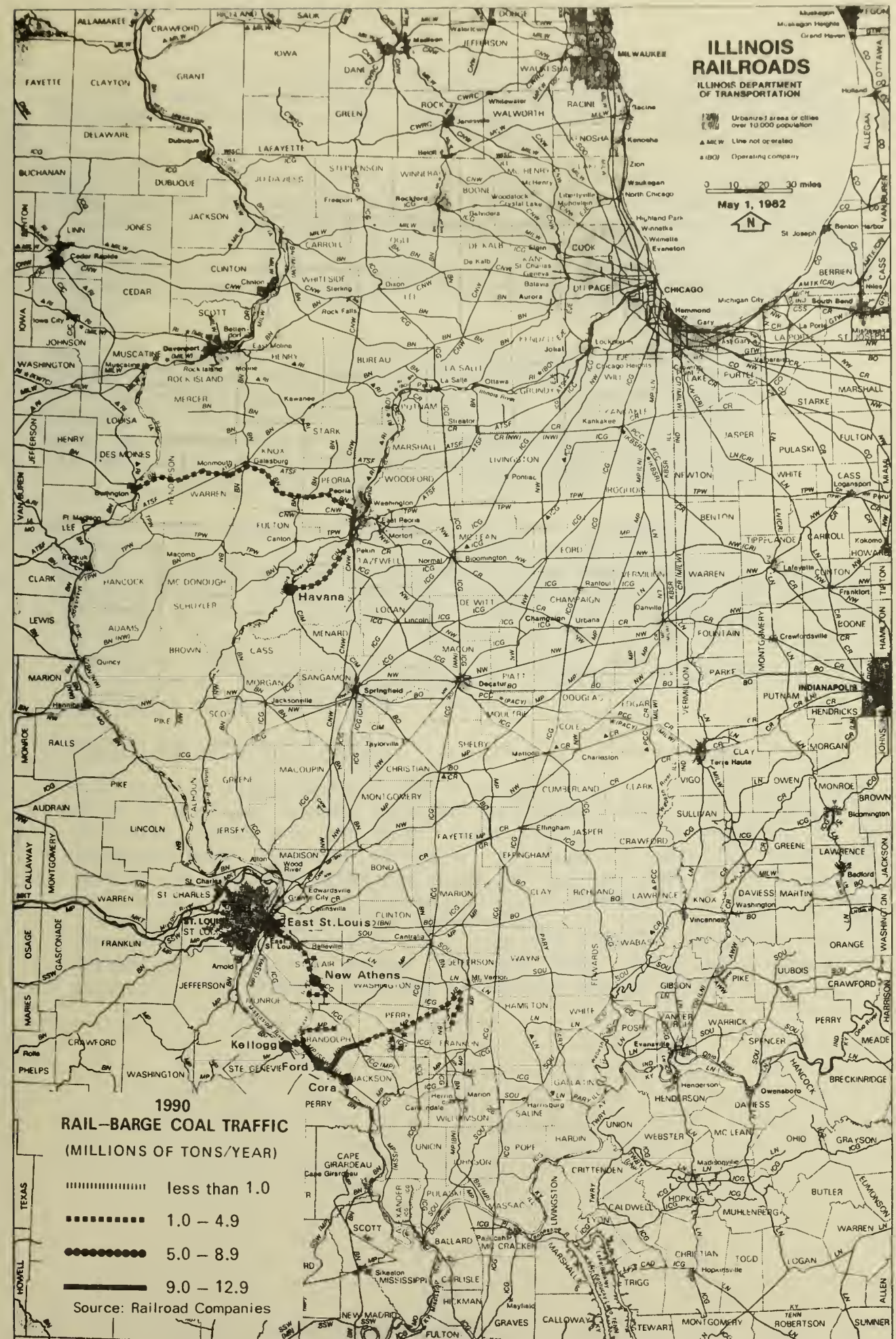
Urbanize 1 area or cities
over 10,000 population

▲ M&W Line not operated

▲ (BO) Operating company

0 10 20 30 miles

May 1, 1982



Changes in coal movements for 1990 are expected at Illinois ports at Quincy, Cora and possibly New Athens, and a port at Mt. Vernon, Indiana, which may handle Illinois coal in the future. Anticipated new coal traffic is summarized as follows:

- o By 1985 Muscatine Power will begin receiving coal from a new Freeman mine at Industry, Illinois; the coal will move by truck to Quincy then by barge up the Mississippi River to the plant.
- o The transloading facility at Cora began operation in 1980. For 1985, 3.2 million tons was identified for long-term utility contracts.
- o Soyland Power Company was originally scheduled to begin operation at Florence in 1987. However, the Board of Directors recently announced that construction of the new plant will be delayed indefinitely. Initial coal shipments will be supplied by Peabody mines in Southern Illinois and transported by barge from the New Athens dock on the Kaskaskia River to the plant via the Kaskaskia, Mississippi and Illinois Rivers.
- o By 1985 Seminole Electric in Tampa, Florida will begin receiving coal from the Mapco mine at Carmi; the coal will be transported via the LN from the mine to a dock on the Ohio at Mt. Vernon, Indiana, then via barge to Port St. Joe, FL, then via rail to the plant.

HIGHWAYS

1980 Coal Traffic

In 1980, Illinois highways carried 4.3 million tons of coal to Midwestern utilities. In the context of the total coal traffic that originated or terminated in Illinois, highways carried 6 percent. Although this level of traffic is small on a statewide basis, currently, five Illinois utility plants receive 100 percent of their coal by truck. These plants are:

- o Central Illinois Public Service's (CIPS) plant in Grand Tower
- o CIPS' plant in Hutsonville
- o Illinois Power's (IP) plant in Oakwood
- o Southern Illinois Power (SIP) in Marion
- o City Water Light and Power (CWLP) in Springfield

Trucks are also used as a secondary or supplemental mode for supplying the CIPS plant in Meredosia. During most of the year, the Burlington Northern Railroad transports coal from the Amax Sun Spot mine to the Frederick dock, where it is transloaded onto barge and carried to Meredosia. When the river freezes, trucks are used, representing about 20 percent of the total annual traffic. The contract for this movement terminates at the end of 1982.

Outlook for 1990 Coal Traffic

Coal traffic transported by truck is projected to be 4.6 million by 1990, which is a slight increase over the 1980 traffic level. With respect to utilities, which are the major users, more coal is projected to be purchased under long-term contract. As shown in Table 49, total coal traffic to utilities increased from 3.9 million tons in 1977 to 4.3 million tons in 1980. The increase in total tonnage was a result of more Illinois coal being purchased out-of-state. As shown on Table 50, the percentage of coal purchased under long-term contract increased from 34 percent to 58 percent between 1977 and 1980. Based on a review of contracts, this trend is expected to continue through 1990.

TABLE 49

SUMMARY OF TRUCK COAL TRAFFIC TO UTILITIES
(Thousands of Tons)

<u>Coal Source/Destination</u>	<u>Actual Traffic</u>		<u>Coal under Contract</u>		
	<u>1977</u>	<u>1980</u>	<u>1977</u>	<u>1980</u>	<u>1990</u>
IL Coal to IL Utilities	3,221	3,032	1,331	1,586	2,325
IL Coal to Out-of-State	288	868	0	530	1,015
KY/IN Coal to IL Utilities	<u>430</u>	<u>406</u>	<u>0</u>	<u>391</u>	<u>325</u>
TOTAL	3,939	4,306	1,331	2,507	3,665

Source: Illinois Department of Transportation.

TABLE 50

PROJECTED TRUCK COAL TRAFFIC FOR 1990
(Thousands of Tons)

	<u>Source of Coal/Destination</u>			<u>Total</u>
	<u>IL Coal to IL</u>	<u>IL Coal to Out-of-State</u>	<u>KY/IN Coal to IL</u>	
<u>1977 Coal Traffic</u>				
Actual Total	3,221	288	430	3,939
Contract	1,331	0	0	1,331
% Contract	41%	0%	0%	34%
<u>1980 Coal Traffic</u>				
Actual Total	3,032	868	406	4,306
Contract	1,586	530	391	2,507
% Contract	52%	61%	96%	58%
<u>1990 Coal Traffic^a</u>				
Projected Total	3,000	1,225	325	4,550
Contract	2,325	1,015	325	3,665
% Contract	78%	83%	100%	81%

- ^a Assumptions: (1) No major increases over 3,665 thousand tons under long-term contract will occur, since most Midwestern utilities already have long-term commitments; (2) Due to the flexibility of the mode, trucks will continue to fulfill short-term and spot coal needs; (3) Based on utility projections of no increases in coal requirements through 1984, no major increases between 1985-90 were projected.

The increase in the coal under long-term contract is primarily due to one movement. City, Water Light and Power (CWLP) in Springfield has a contract to purchase one million tons/year from Turris Coal Company's new Elkhart mine. Initial shipments began in November 1982. Based on CWLP's projected coal requirements of 950,000 tons/year through 1990, this contract could supply all of the fuel the utility will need. However, small shipments may supplement this contract based on demand for electricity. The highways that would be used for the coal movement are I-55 Frontage Road from Elkhart to I-55 at Williamsville, then I-55 to the plant. The CWLP truck movement and others from origin to destination for 1980 and 1990 are listed on Table 51.

A closer look at the mid-eighties reveals an increase in traffic resulting from short-term use of trucks to fulfill utility coal needs. Two short-term movements were identified--representing 1.3 million tons in addition to the 3.7 million tons under long-term contract.

Beginning in April 1982, the CIPS plant in Newton began receiving 400 thousand tons/year from Black Beauty Coal's Apraw mine in Indiana. This short-term contract terminates in April 1985.

A second movement that will represent a major increase in coal traffic over Illinois highways, although temporary, involves a shift in coal contracts by the Central Illinois Public Service (CIPS) plant in Coffeen. Currently, the Coffeen plant receives the majority of its coal via a conveyor from Consolidation Coal's Hillsboro mine.³⁷ By 1986, CIPS expects to receive all its coal from the Monterey #1 mine. It is anticipated that during the initial two years of the Monterey #1 move, trucks will carry approximately 40 percent (880,000 tons) of the coal from the mine to the utility while necessary rail improvements are made to handle the entire movement. The highways that would be used for this movement are IL 4, IL 16, IL 127 and IL 185.

³⁷ In 1976 CIPS filed a suit against Consolidation Coal for non-compliance with the contract. The case is scheduled for trial March 7, 1983. CIPS has continued to purchase coal from the Hillsboro mine under a court injunction. A precise start-up date for this shift is uncertain due to this legal action by Consolidation Coal. Regardless of possible court action, CIPS contract with Consolidation Coal will end in 1986.

TABLE 51

1980 AND 1990 TRUCK COAL TRAFFIC BY UTILITY^a
(Thousands of Tons)

<u>Utility^b</u>	<u>Mine</u>	<u>Actual</u>	<u>Long-Term Contracts</u>	
		<u>1980</u>	<u>1980</u>	<u>1990</u>
CIPS, Coffeen ^c	Monterey #1	287	287	0
*CIPS, Grand Tower	Amax Delta	300	300	300
	Freeman #11	221	221	425
*CIPS, Hutsonville	Black Beauty			
	Apraw, (IN)	391	391	325
CIPS, Meredosia	Amax Sun Spot	147	147	0
*CWLP, Springfield	Zeigler Murdock	250	0	0
	Freeman Crown II	596	0	0
	Monterey #1	100	0	0
	Turris Coal, Elkhart	0	0	1,000
*IP, Oakwood	Zeigler Murdock	431	431	400
*SIP, Marion ^d	Williamson #1	200	200	200
	Unspecified IL	500	0	
SBMU, Sikeston, MO	Burt Chamness	30	30	30
MPW, Muscatine, IA	Freeman Industry	0	0	485
TVA, AL	Benford Nightengale	156	0	0
TVA, TN	Morris Coal #5 & #7	122	0	0
WIPCO, Pearl	Neimo Fuels, MO	15	0	0
EILP, Montpelier, IA	Midland Rapatee	60	0	0
FP, Inglis, FL	Amax, Delta	500	500	500
TOTAL		4,306	2,507	3,665

*100% of coal was received by truck in 1980.

a Two movements not included in this table are: 400 thousand tons/year is being delivered to CIPS in Newton between April 1982 through April 1985 from Black Beauty's Apraw mine in Indiana; Peabody mines in the Freeburg area deliver 200 thousand tons/year of coal to St. Louis utilities.

b See Utility Abbreviations, page 146.

c Trucks are expected to supply 880 thousand tons/year or 40 percent of the coal required during a two-year period sometime between 1983 and 1988, while rail repairs are underway to allow rail service between Monterey #1 and the Coffeen plant. The Monterey coal contract is contingent upon the outcome of CIPS court case with Consolidation Coal. In 1980, conveyor was the primary mode used.

d SIP received 500 thousand tons from unspecified mines via truck. This traffic was not counted in the total due to lack of specific data on movements.

Source: Illinois Department of Transportation.

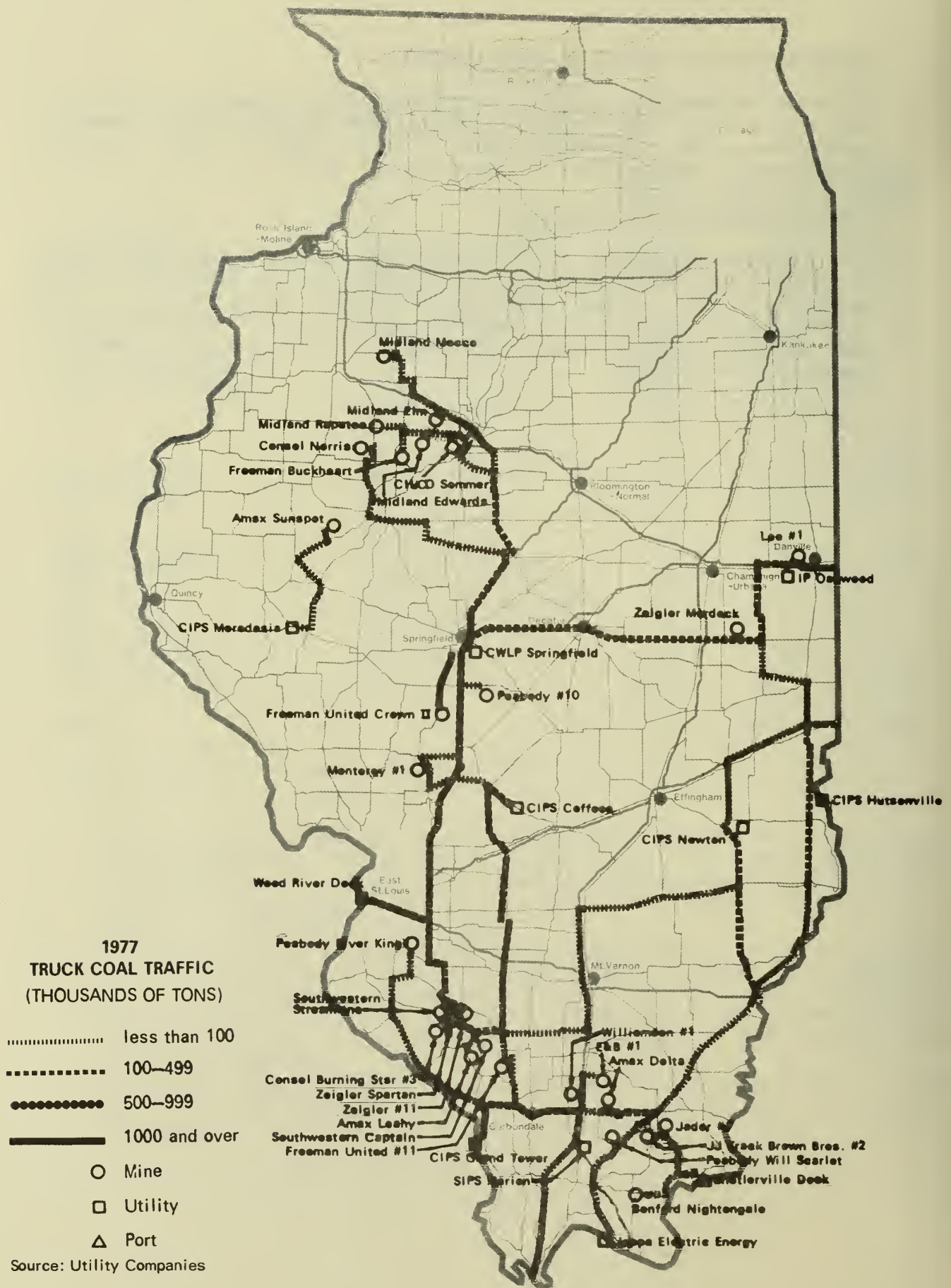
Concentration of Traffic on Fewer Highways

A review of long-term contracts indicated a trend toward a concentration of traffic over fewer routes. This trend is illustrated through a comparison of the coal traffic over Illinois highways in 1977, 1980 and projected for 1990 as shown on Figures 26, 27 and 28.

Physical Condition of Coal Routes

The Illinois Department of Transportation evaluates the condition of highways under its jurisdiction. Factors used in its evaluation include a rating of the physical condition and average daily traffic for all traffic, heavy truck traffic and coal truck traffic. The condition of the Illinois highways used to transport coal during the 1980s is summarized in Table 52.

Figure 26



(THOUSANDS OF TONS)

1000 and over

Δ Port

Source: Utility Companies

Figure 28

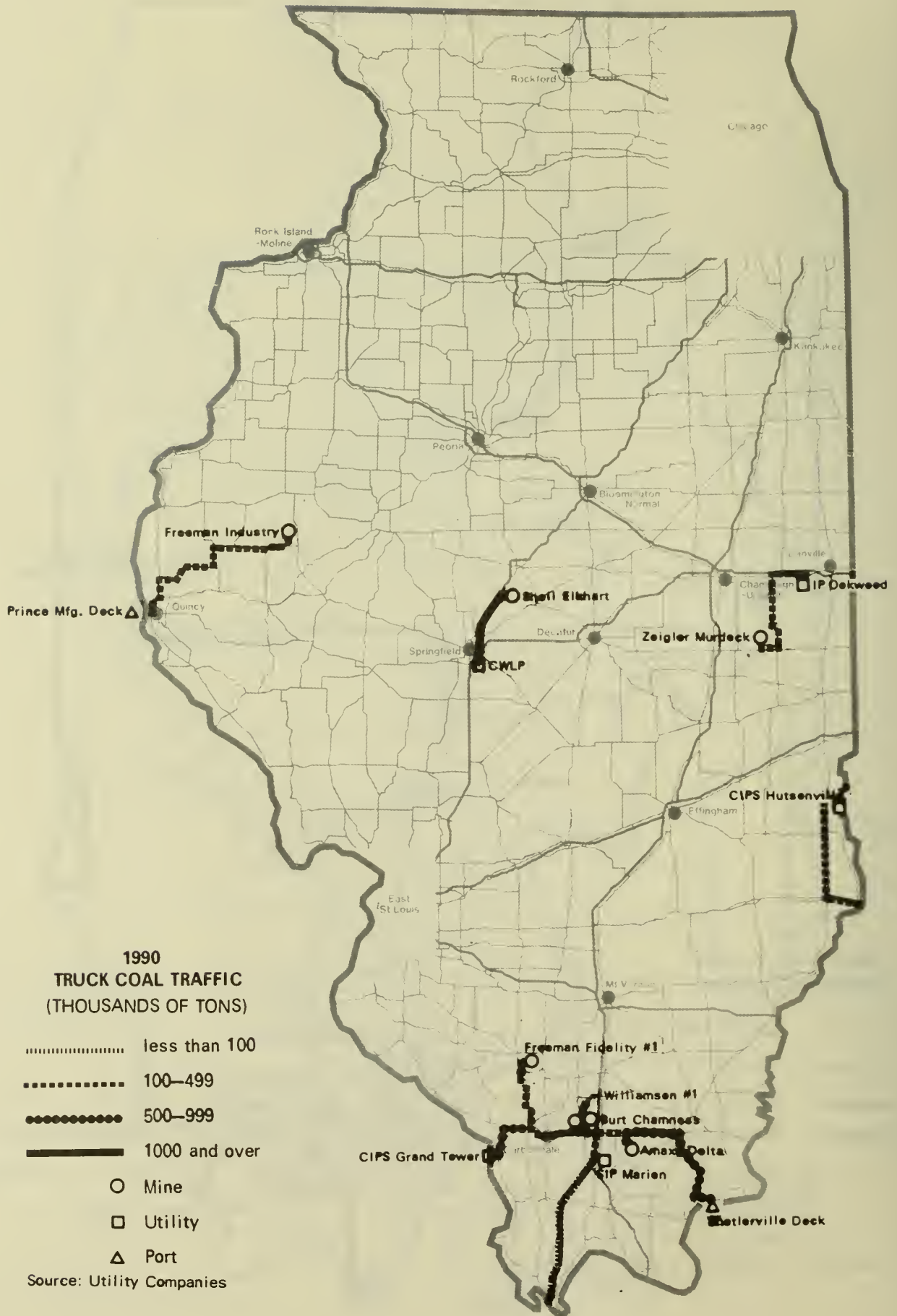


TABLE 52

SUMMARY OF HIGHWAY CONDITIONS FOR COAL ROUTES

Mine	Utility	Route	Highway Condition ^a	Average Daily Traffic (1979-80)		Average Daily Coal Traffic		
				Total	Trucks ^b	Coal Trucks ^c	1985-1990	
							1985	1990
Monterey #1	Coffeen	IL 4	4.9	3,500	350	36	0-110	0
		IL 16	6.0	2,800	350	36	0-110	0
		IL 127	6.8	6,500	650	36	0-110	0
		IL 185	5.3	3,900	450	36	0-110	0
Amax Delta	Grand Tower	IL 13	7.0	16,000	450	37	37	37
		IL 149	5.2	4,750	400	37	37	37
		IL 3	6.1-8.3	1,500	400	37	37	37
Freeman Fidelity #11	Grand Tower	IL 152	5.0	2,650	70	28	50	53
		IL 13	7.0	3,850	300	28	50	53
		IL 149	5.2	4,750	400	28	50	53
		IL 3	6.1-8.3	1,500	400	28	50	53
Black Beauty(IN)	Hutsonville	US 50	5.1	5,200	1,000	49	42	40
		IL 1	5.7	3,000	500	49	42	40
Amax Sun Spot	Meredosia ^d	US 24	5.5	2,000	250	18	18	18
		US 67	6.0	3,000	500	18	18	18
		IL 104	5.3	4,000	500	18	18	18
Zeigler Murdock	Springfield	US 36	5.5	4,000	175	31	0	0
		I-72	8.5	6,000	1,150	31	0	0
		I-55	9.0	23,000	3,900	31	0	0
Freeman Crown II	Springfield	IL 4	5.4	5,600	300	74	0	0
		US 36	8.5	10,700	1,600	74	0	0
		I-55	8.5	19,500	3,900	74	0	0
Monterey #1	Springfield	IL 4	5.4	5,600	300	12	0	0
		IL 108	7.6	1,650	325	12	0	0
		I-55	7.5	13,000-19,500	3,500	12	0	0

TABLE 52 (Cont'd.)

SUMMARY OF HIGHWAY CONDITIONS FOR COAL ROUTES

Mine	Utility	Route	Highway Condition ^a	Average Daily Traffic (1979-80)		Average Daily Coal Traffic		
				Total	Trucks ^b	Coal Trucks ^c	1985	1990
Turris Coal Elkhart	Springfield	01d US 66	6.0	1,000	NA	0	125	125
		I-55 at Williamsville	8.0	15,000-21,000	3,900	0	125	125
Williamson #1	Marion	IL 148	7.4	10,300	750	25	25	25
		IL 37	6.4	3,600	2,700	25	25	25
Burt Chamness	Sikeston(MO)	IL 13	7.6	8,900	750	4	4	4
		I-57	6.2	3,000-10,000	1,850	4	4	4
Neimo Fuels(MO)	Pearl	IL 54	8.0	2,000	150	2	0	0
		US 36	6.0	3,000-6,000	750	2	0	0
		IL 100	4.9-8.0	1,000	150	2	0	0
Benford Nightengale	TVA, Colbert, AL	IL 146	4.9	1,600	225	19	0	0
		IL 34	5.1	3,400	350	19	0	0
Rapatee	Montpelier, IA	IL 116	7.5	1,300	325	7	0	0
		IL 97	9.0	2,000	200	7	0	0
		I-74	7.0	8,500	3,000	7	0	0
		I-280	5.0	8,000-14,000	2,300	7	0	0
Zeigler Murdock	Oakwood	IL 49	5.4	800-3,100	300	54	50	50
		I-74	6.4	12,000	3,200	54	50	50
Freeman Industry	IA	IL 101	4.5	450	90	60	60	60
		IL 61	6.0	600-1,350	90	60	60	60
		IL 96	6.5	2,800-9,000	300	60	60	60
		US 24	6.8	12,400	650	60	60	60

TABLE 52 (Cont'd.)

SUMMARY OF HIGHWAY CONDITIONS FOR COAL ROUTES

<u>Mine</u>	<u>Utility</u>	<u>Route</u>	<u>Highway Condition^a</u>	<u>Average Daily Traffic (1979-80)</u>		<u>Average Daily Coal Traffic</u>	
				<u>Total</u>	<u>Trucks^b</u>	<u>Coal Trucks^c</u>	<u>1985</u> <u>1990</u>
Classic Coal, Morris #5 & #6	TVA, TN	IL 13	5.2-8.0	2,300-6,600	600	15	0 0
Amax Delta	Florida Power, FL	IL 13 IL 34	5.2 5.7-9.0	4,150-6,600 2,000-3,400	700 350	62 62	62 62
Black Beauty, IN	Newton	US 50 IL 130 IL 33	4.8-8.5 6.1-6.9 5.8	4,000-5,900 3,100-8,200 3,700-8,500	400-700 300 350	0 0 0	50 50 50

^a 1980 Condition Rating on a scale from 1-10, with 10 representing a highway in excellent condition.

^b Includes 6-tire and 3-axle single unit trucks, buses and all multiple-unit trucks.

^c Average daily coal trucks calculated by using 22-ton trucks and 365 days/year.

^d The Meredosia plant currently receives coal from Sun Spot mine under short-term contracts. Shipments are anticipated to continue through 1985 and possibly 1990. The maximum average daily coal truck traffic for 1985-90 is 18 trucks/day

Source: Illinois Department of Transportation.

CONVEYOR

Conveyor movements, while small in terms of overall tonnage, are efficient for short distance coal transportation. In 1980 Peabody Coal Company transported 3.1 million tons of coal from its No. 10 mine in Christian County to Commonwealth Edison's Kincaid Plant and 3.0 million tons from its Baldwin and Marissa mines in Randolph County to Illinois Power's Baldwin Plant. Consolidation Coal transported 1.9 million tons of coal from its Hillsboro mine in Montgomery County to Central Illinois Power's Coffeen Plant via conveyors.

The only significant change in conveyor traffic anticipated in the near future is the possible cessation of the Hillsboro-Coffeen movement. Currently, CIPS is suing Consolidation Coal Company for contract violations. CIPS will continue to receive coal from the Hillsboro mine until the case is decided or until 1986, when the contract terminates. The trial is scheduled for March 1983. For future coal requirements, the Coffeen utility has a contract for 1.2 million tons/year with Monterey Coal Company to begin receiving coal in 1983, contingent upon the outcome of the court case. This coal would be transported via trucks for about two years, until railroad repairs could be made for the long-term transportation. For the interim two-year period, trucks would carry 40 percent of the traffic and 60 percent would be transported via railroad. The outcome of the court case will influence the source of coal for the Coffeen plant.

SUMMARY

The modal distribution of coal traffic is not expected to change significantly in the near-term future. Railroads and rail-barge will continue to be the primary modes used for moving coal in Illinois. The majority of railroad coal traffic is now routed over lines capable of handling unit trains. Due to recent and planned investment, railroads and barges are expected to be able to handle coal traffic volumes this decade.

Although trucks carried only 6 percent of the total 1980 coal traffic in the state, they are important for supplying the coal needs for five Illinois utilities. Between 1980 and 1990, truck coal traffic will be concentrated on fewer routes. Due to short-term contracts, truck coal traffic is projected to increase during the mid-eighties, then by 1990 to resume a traffic level slightly higher than the 1980 level. The Illinois Department of Transportation will continue to take the coal transportation highway requirements into consideration in developing its Annual Highway Improvement Program.

ABBREVIATIONS

<u>Railroad</u>	<u>Abbreviation</u>
Atchison, Topeka & Santa Fe Railway Company	ATSF
Baltimore & Ohio Railroad Company	BO
Belt Railway Company of Chicago	BRC
Burlington Northern Railroad	BN
Chicago & Illinois Midland Railway Company	CIM
Chicago & North Western Transportation Company	CNW
Chicago & Western Indiana Railroad Company	CWI
Chicago, Milwaukee, St. Paul & Pacific Railroad (Milwaukee Road)	MILW
Chicago, Rock Island & Pacific Railroad Co. (Rock Island Railroad)	RI
Chicago, South Shore & South Bend Railroad	CSS
Merged Chessie and Family Lines Systems	CSX
Consolidation Rail Corporation (Conrail)	CR
Elgin, Joliet & Eastern Railway Company	EJE
Illinois Central Gulf Railroad	ICG
Illinois Terminal Railroad Company	IT
Louisville and Nashville Railroad Company	LN
Missouri Pacific Railroad Company	MP
Norfolk & Western Railway Company	NW
Peoria & Pekin Union Railway Company	PPU
Soo Line Railroad Company	SOO
Southern Railway Company	SOU
Toledo, Peoria & Western Railroad Company	TPW

ABBREVIATIONS

<u>Utility</u>	<u>Abbreviation</u>
Central Illinois Light Company	CILCO
Central Illinois Public Service Company	CIPS
City Water Light and Power, Springfield	CWLP
Commonwealth Edison	Com. Ed.
Eastern Iowa Light and Power Cooperative	EILPC
Florida Power Corporation	FP
Illinois Power Company	IP
Muscatine Power and Water	MPW
Sikeston Board of Municipal Utilities	SBMU
Southern Illinois Power Service Company	SIP
Tennessee Valley Authority	TVA
Western Illinois Power Company	WIPCO

GLOSSARY

Anthracite - hard coal containing little volatile matter, high in BTU content and requires higher temperatures to ignite.

Bituminous - medium soft coal that yields considerable volatile matter when burned, has a lower BTU content than anthracite, and is the most abundant type of coal in the United States.

BTU - British Thermal Unit, amount of heat required to raise the temperature of one pound of water 1° Fahrenheit.

Collier - coal hauling ship.

High Sulphur Coal - coal with a sulphur content greater than 1 percent.

Lignite - extremely soft coal with a low BTU content; it is not widely used.

Low Sulphur Coal - coal with a sulphur content of less than or equal to 1 percent.

Metallurgical Coal - coal used by the steel industry.

Metric Ton - 2,205 lb.; whereas a short ton is 2,000 lb.

Reserves - the total amount of coal that is potentially minable by either underground or surface methods, as defined by the U. S. Bureau of Mines and the U. S. Geological Survey. Illinois' reserves are 68 billion tons.

Resources - the total amount of coal estimated by the U. S. Geological Survey to be underground. Illinois' resources are 162 billion tons.

Steam Coal - coal used by utilities and cement industries.

Sub-Bituminous - coal that is mostly low sulphur and has a lower BTU content than bituminous coal.

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